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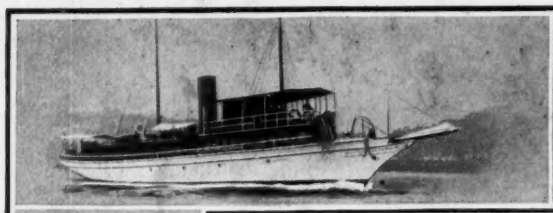

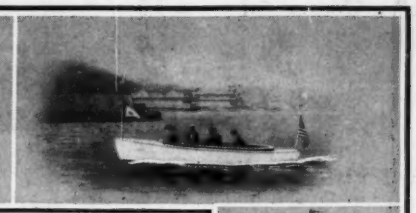
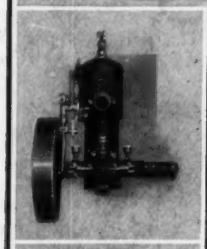

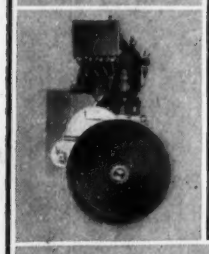
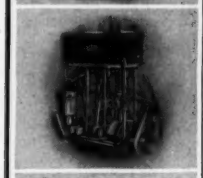

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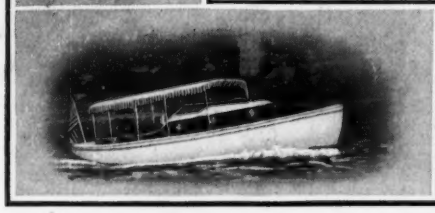
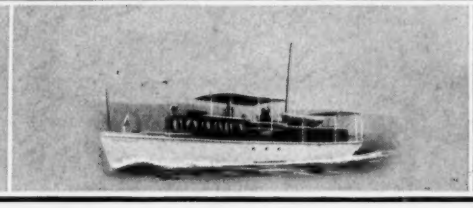
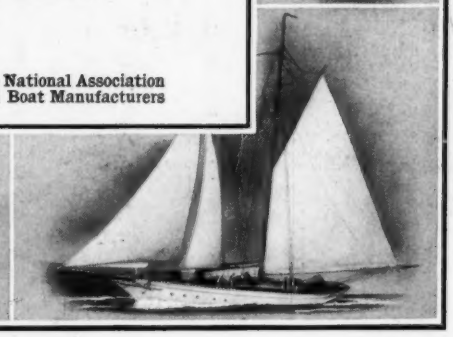

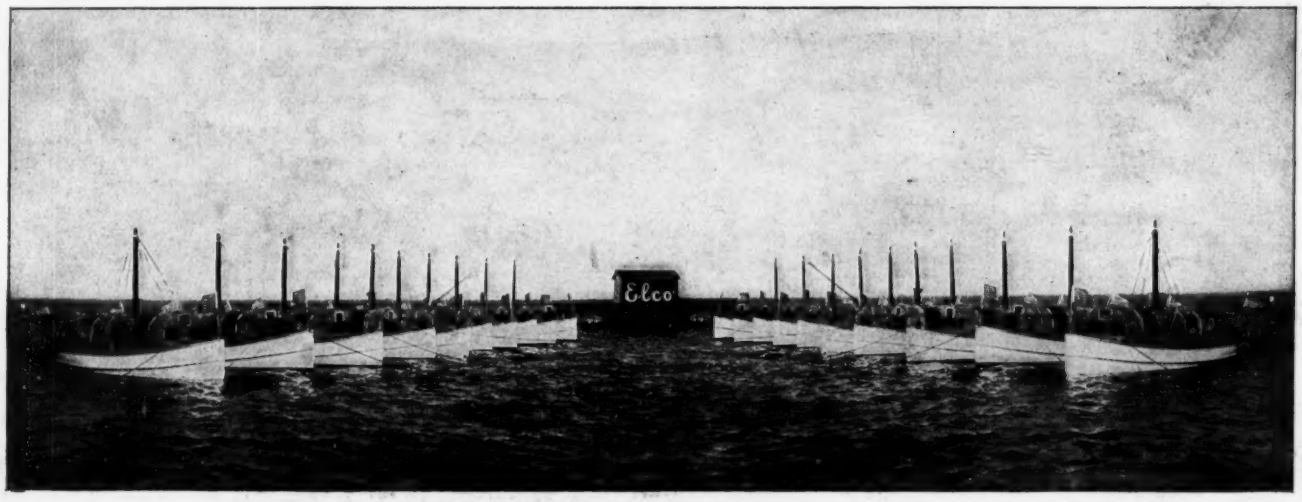

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LAWRENCE PERRY, Editor HERBERT L. STONE, Managing Editor

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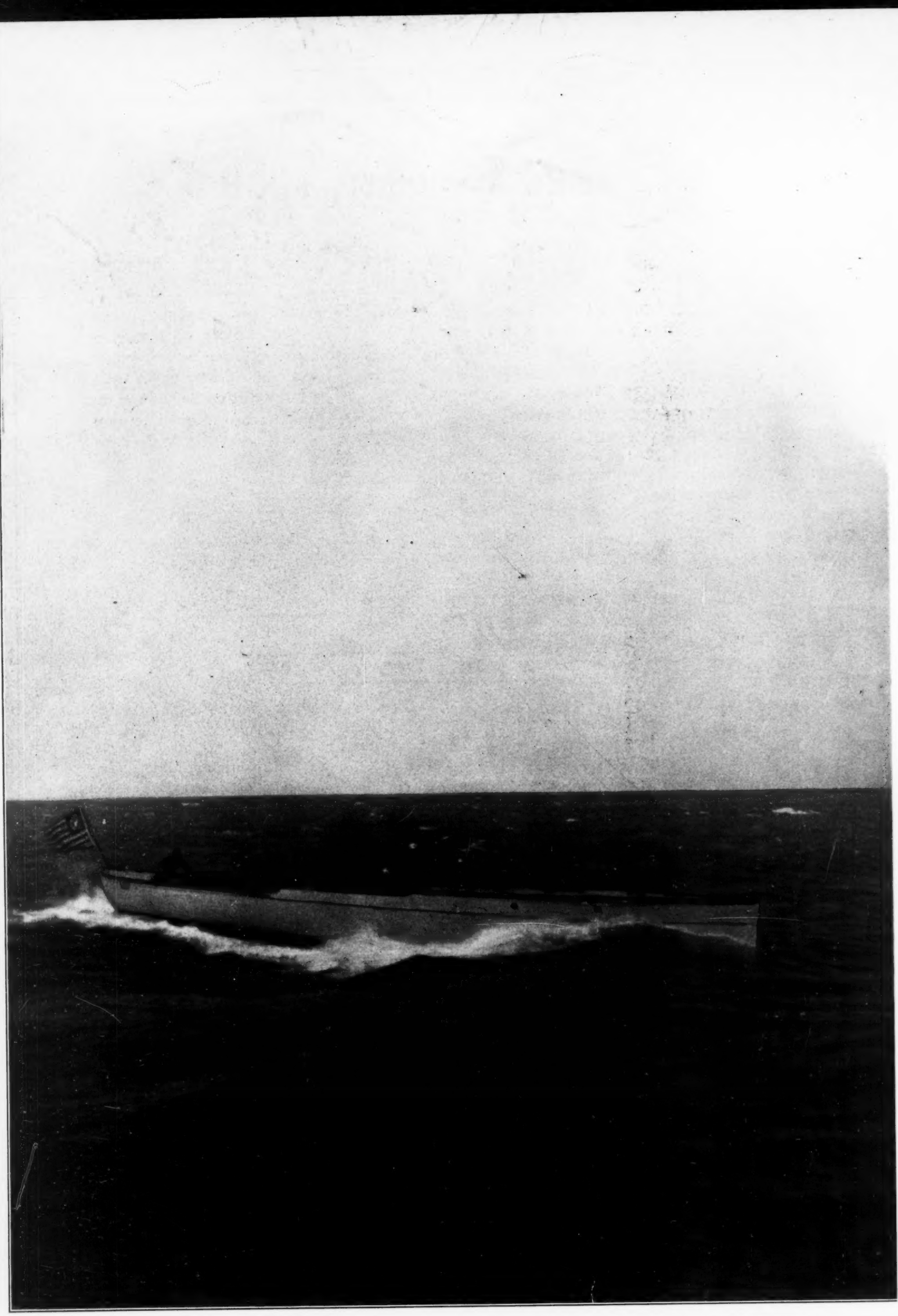

THIS DESIRE FOR CRUISING IN THE OPEN IS DEVELOPING THE POWER BOAT ALONG LINES OF STRENGTH AND SEAWORTHINESS.

YACHTING

VOLUME V. NUMBER 1

January, 1909

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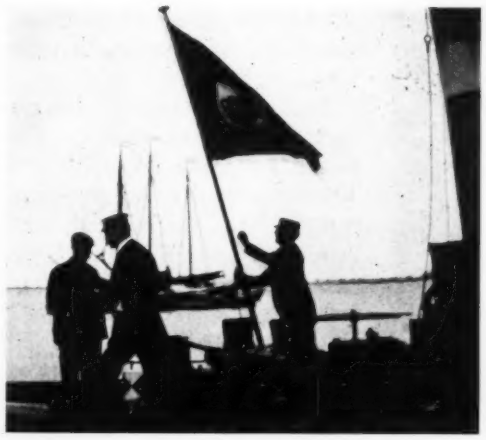
ONE OF THE DUTCH CONTESTANTS, EQUILIBRIST, OF THE SPAARNE CLUB.

READY FOR THE SUPREME TEST. TAUTOG PADDLING OUT OF THE BASIN OF THE ROYAL NETHERLANDS CLUB.

HOK MAKING FOR THE STARTING LINE. SHE WAS DISTINGUISHED BY THE CHINESE CHARACTER ON HER SAIL.

The International Dory Race

By HERBERT L. STONE



COLORS. BREAKING OUT THE BURGEE OF THE ROYAL DE HOOP CLUB PREPARATORY TO THE START.

WHEN the American Yacht Club, of Milton Point, started dory racing at the western end of the Sound, and the lead was followed by the Crescent, Athletic and the Gravesend Bay Clubs, an international race for the dory class seemed far from the realms of possibility. The dories proved themselves staunch little boats, however, extremely fast for their size, and were productive of keen sport, especially where inter-club team races were started.

But the New England coast and Long Island Sound are not the only places where dories are sailed for all that there is in them. Some of the yacht clubs of Holland have taken them up and built a sailing dory modeled after the boats used here, the "Y" at Amsterdam, near the head of the Zuyder Zee, affording excellent racing ground for the little fellows.

The success of the International *Sonderklasse* races at Marblehead and Kiel having demonstrated the good sport that is to be had in the smaller classes, the New York Athletic Club, in the autumn of 1907, took the initiative and intimated to the yacht clubs of the Zuyder Zee that they might be willing to send a team of dories over to race against a team from their clubs. After considerable delay—for the Hollanders move slowly in such weighty matters—the Royal Rowing and Sailing Club "de Hoop" (pronounced and meaning *hope*), of Amsterdam, about the end of April rose to the occasion—took the bait, as it were—and offered a trophy for such a series of races, naming the end of August as the date.

The conditions governing the contest were that the boats were to be not over 13 feet 2 inches on the bottom, 18 feet 2 inches over all, 5 feet of beam, and to carry not more than 130 feet of sail area. They were to be built entirely of wood, and the lateral plane of resistance of the centerboard was to contain not more than 360 square inches. The rules governing the contest were that the boat first taking three races won. At the end of three races any boat that had not won a race dropped out, and the remaining boats fought it out until one boat had taken three events. The crew were to be amateurs, natives of the country from which their boats hailed, and limited to three in number.

Now it happened that of the three men who had, the previous autumn, signified their willingness to enter boats and go aboard if their boats were successful, two found themselves unable to go at that time and asked to have the date changed to July. This the Hollanders cabled that they could not do, and that the races must be sailed at the end of August, whereupon two of the Americans withdrew and the whole matter seemed about to fall through. At this juncture Mr. George Gardiner Fry, a member of the American Yacht Club and owner of Tautog, expressed himself as still willing to go, and, if necessary, sail alone against the Dutch team. At the time Tautog was being raced in the Long Island Sound regattas, and, as it turned out, if only one man was to go, Mr. Fry was the logical representative of the class, his boat having won a majority of the races up to the time of his departure, and the championship of its class the previous year (1907).

Sailing on the same steamer on which he had shipped his dory, Mr. Fry arrived in Holland only four days prior to the date set for the first race. Owing to some delay, his boat did not reach Amsterdam until Monday afternoon, while the first race was scheduled for Wednesday. This meant lively work to get ready in time, even if the boat was small. Mr. Fry was given a diagram of the course, but up to the day of the race had not had time to sail over

it. For crew he had picked up his nephew, Sheridan B. Fry, a youngster of fifteen, who happened to be on the Continent, and Dr. Kelly, the American surgeon of the S.S. Rotterdam, which was in port at the time.

The Hollanders entered four boats, Hok, Mr. Th. Hagnauer; Humpty Dumpty, Mr. L. D. Fortuyn, and Raaf, Mr. H. Raven, all of the Royal "de Hoop," and Equilibrist, of the Spaarne Club, of Haarlem. Wednesday, the day scheduled for the first race, was cold and wet, with the rain coming down in torrents and a heavy wind blowing, which kicked up a nasty sea in the "Y" (pronounced I), where the race was to be sailed. Tautog, with a reef tucked in her mainsail, left the basin of the Royal Netherlands Club, where she had fitted out, and ran across the "Y" to the Orange Sluice, where Mr. Fry understood that the race was to start. After hanging around for half an hour and seeing nothing of the other boats, he went ashore and telephoned to the "de Hoop" to find the trouble. To his astonishment, he was told that the race had already started. Disheartened, he went back to his boat. To get back to the Royal Club on the "Y" meant a hard beat dead to windward in the rain and heavy sea, but with young Fry tending jib sheet and Dr. Kelly bailing, they started. On getting into the open they saw the Dutch boats, evidently sailing the race, and, putting their boat abreast of the bunch, they sailed one leg of the course. After a time they heard a gun, and on asking what it meant, were informed that it was the finish of the race; and on going ashore they found that they had mistaken the course and that, when they did not arrive at the time set, the race had been started without them. To say that they were discouraged would not half convey their feelings. They had come nearly 4,000 miles for this series, at considerable expense and inconvenience, and here the first race had been sailed, while they, soaked to the skin, cold and disappointed, had not even had a smell of it. But Mr. Fry cautioned his crew not to put up a kick. "It's only one leg, anyway," he said, "and, from the few minutes we sailed with their boats, I'm not afraid that we'll come in last next time."

TAUTOG UNDERGOING HER FINAL TRY-OUT IN AMERICAN WATERS.

But with sportsmanlike spirit, Mr. J. J. Blussé, president of the club, and the chairman of the regatta committee, Mr. Vandertook, called a meeting of the committee, and, at its conclusion, announced that the race had been declared off, and that the first race would take place the following day.

The next day, when the race was started, it was still blowing hard. In fact, it blew so hard during the entire series that reefs were carried in every race, and there were numerous capsizes, the low, flat lands of Holland offering no shelter. In the first day's racing, in which the Americans did not compete, Raaf capsized before the start, but was bailed out and got to the line on time. The Hollanders were at an advantage in this, for as the dories carried no ballast the weight of the crew counted for much, and the men on the Dutch crews were all large, weighing close to 200 pounds apiece, while Tautog's crew, with one boy, was a light one.

The course for the first race was to windward and return, to be sailed twice, a total distance of 5½ miles. It was a one-gun start, and at the report the boats crossed the line in the following order: Hok, Humpty Dumpty, Equilibrist, Tautog and Raaf, Tautog having had her start spoiled by a passing steamer, which nearly ran her down. With the exception of Raaf, which could not keep up, the boats kept well together, Tautog slowly pulling into the leading position and turning the first mark about two minutes ahead of Hok, which, in its turn, was two minutes ahead of Humpty Dumpty and Equilibrist, with Raaf entirely out of the running. Tautog continued to pull away, and though Hok gained on her somewhat on the second round, she was never headed during the remainder of the race, the boats finishing in the following order:

Tautog, 52 minutes 10 seconds, elapsed time.
Hok, 53 minutes 55 seconds, elapsed time.
Humpty Dumpty, 56 minutes 30 seconds.
Equilibrist, 58 minutes 50 seconds.

As the finishing gun boomed forth the American flag was hoisted on the committee boat, as an attention to the visitor. In speaking of the race, an Amsterdam paper had this to say of the American boat:

"The Tautog is a nice-looking boat, and it seemed to us as if she is steadier in the water than our boats. This is partially due to the fact that her whipstaff (tiller) is much longer than those of the other dories, which permits of the steersman and other sailors being placed more in the center of the boat"; meaning, of course, that she trimmed better.

The following day saw two races sailed, which proved to be the last, as Tautog won both. This time she had but two competitors, Equilibrist and Raaf dropping out. Mr. P. L. Lucassen, who sailed Hok in these last two international races, is considered the best sailor in Holland, having, it is said, twice won the international race for 8-meter boats between Holland and Belgium. It will be seen that the two boats that still remained in the race were the ones that had done the best the previous day. Owing to the heavy southeast wind and rough sea, the course was reduced to 2¾ miles in length, and was triangular. The start was made at 10.45. Hok crossed first, but hung badly on the line, and Tautog, which was close behind, soon opened up a good lead. It was very rough and the wind blew a small gale, the crews of the boats having to bail constantly to keep them afloat. Hok hung on tenaciously, however; but did not make as good weather of it as did Tautog, and was constantly being luffed when the heavy puffs struck her.

The boats rounded the first mark almost together. It was a run to the second mark, and Tautog drew a little ahead, though the closeness of the race may be judged from the fact that she only turned the second mark 4 seconds ahead of Hok. The last leg was a beat, and on it the Humpty Dumpty drew up on Hok and might have passed her had she not been knocked down in a heavy puff and capsized. On this leg the American boat was at her best, clawing up to windward better than Hok. Tautog won the race handily in 23 minutes and 30 seconds, elapsed time, while

No. T20.5 ...
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TAUTOG NEARING FINISH LINE IN THE FIRST RACE, WELL AHEAD OF THE OTHER BOATS.

TAUTOG AND HOK LEADING HUMPTY DUMPTY. THE LATTER MAY BE SEEN LUFFING JUST BEFORE SHE CAPSIZED.

Hok took 30 minutes to cover the course, being bothered by a passing tug after Tautog had finished.

An Amsterdam paper gives a witty description of the capsize and the rescue. I quote: "The Hok did not sail so badly in this race, but in manoeuvering the American was far ahead. When the wind became too strong the Hok dared not maintain its course any longer, and showed a kind of drunkard's walk. On the second leg Humpty Dumpty began to win over Hok, which proved her undoing. Her crew were seen scooping; she fell off; suddenly a wave struck her and she capsized. It was a tragic sight—those three white-knitted bodies" (the crew wore white sweaters) "rising above the water and clinging to the capsized boat. One even succeeded in keeping his glasses on his nose. The crew of a motor boat threw a life belt to the shipwrecked persons and soon had them on board. The captain succeeded in pumping the boat out and towing her in, while the crew of Humpty Dumpty pumped in some drams for the cold." They have a keen sense of humor, these Hollanders!

The shipwreckcd men of the Humpty Dumpty evidently could see no more pleasure in going in for the third race, which was sailed a little later under even more strenuous conditions. This left Hok and Tautog the only competing boats.

But the American was not to have everything his own way. Hok got away in the lead in this last race, and drew ahead for awhile. But Tautog hung on and finally took the lead, the boats turning the outer mark close together, with Tautog a little ahead. After rounding, Hok again took the lead for a while, and the Hollanders were elated at the prospect of winning one of the races. But Mr. Fry sailed Tautog with admirable coolness and judgment, taking the wind from Hok once or twice, and finally landing his boat in first place. It was now raining and blowing harder than ever, and the crews were constantly bailing to keep the boats clear. It was weather in which any other race would have been postponed. Tautog fairly tore through the water and made much better weather of it than Hok, though the latter hung on doggedly, the American boat finally winning by only one minute. As she flashed over the finish line, shipping water over the lee rail and traveling like a witch, the Stars and Stripes were broken out from the committee boat and from the dock of the Holland-America Line nearby, and the winner was heartily cheered. Mr. Fry quickly borrowed a Dutch tricolor and flew it at his masthead, as the racers lowered their sails and were taken in tow of the committee boat for the Yacht Club basin.

Tautog thus won the international trophy, which becomes the permanent possession of Mr. Fry, and consists of a model in silver of an old Dutch full-rigged ship, with every detail of rigging and hull admirably designed and worked out.

This ended the International Series, but on the following Monday Mr. Fry entered Tautog in the dory race of the Royal Netherlands Club, sailing against his old rivals, Hok and Humpty Dumpty, besides a number of other dories. In this race one of the Hollanders, Mr. Vandertuuk, of the "de Hoop" Club, sailed with him. It was an extremely close race, but Tautog, when leading all the Dutch boats, carried away first her starboard and then her port stay. Though she kept on, this rendered it impossible for her to take first place, and she finished second to Hok, but only 24 seconds behind her in an 8½-mile race, receiving a handsome silver medal as second prize, and defeating by an ample margin four other entries.

The entire series was marked by the utmost good feeling on the part of the Hollanders. They were most hospitable, were uniformly courteous, and accepted defeat in a sportsmanlike spirit that might well be emulated at some of our races on this side.

To Mr. J. J. Blussé, the president of the Royal de Hoop Club, and to Mr. Vandertuuk, of the regatta committee, is due great credit for the manner in which the affair was conducted and for the good feeling engendered.

There is talk of the three Royal Holland Clubs getting up a team to sail a return match here during the coming summer. That they will get an invitation from some of our clubs goes without saying, negotiations already being under way, and it is to be hoped that nothing will prevent their coming. Whatever the outcome of these races, the American yachtsmen will see to it that the Hollanders do not regret the journey across the Western Ocean.

TAUTOG IN THE BASIN AFTER THE RACE.

HOK AND TAUTOG.

PUTTING FINISHING TOUCHES ON TAUTOG.

The Up-to-Date Cruiser of Moderate Cost

WHAT A MAN CAN GET FOR LESS THAN ONE THOUSAND DOLLARS

By E. T. KEYSER

Illustrations by Courtesy of Racine Boat Manufacturing Company, Bath Marine Construction Company, and Rice Brothers.

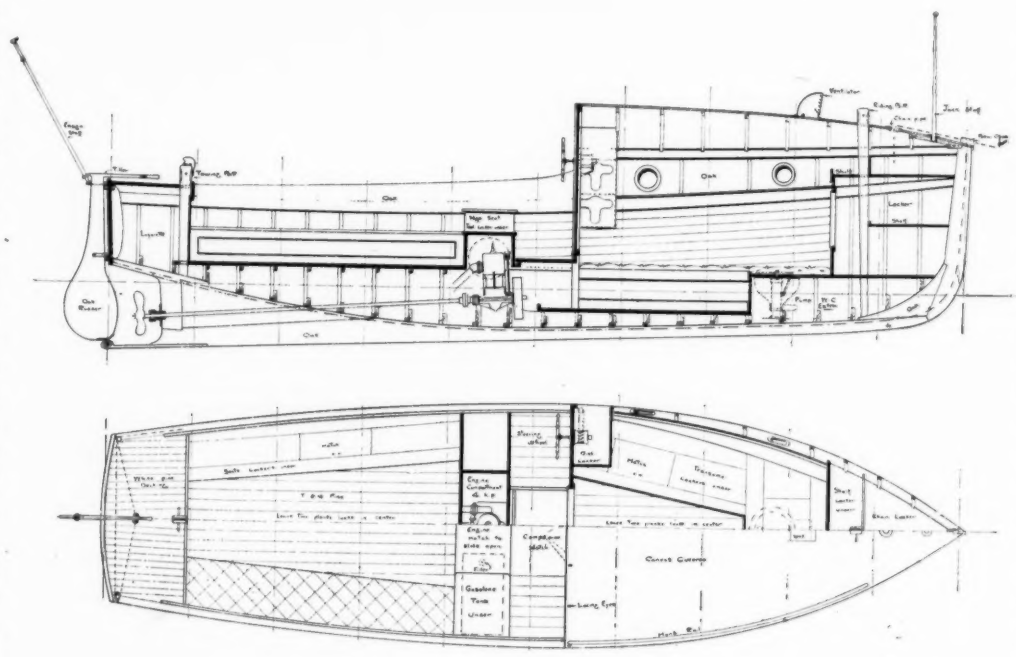
IT is an old and threadbare observation that the luxuries of yesterday are the necessities of to-day. This statement has become a truism through the progress of the times that has succeeded in bringing within the reach of the man of moderate means many of the comforts and pleasures which, but a few years ago, belonged exclusively to the few.

I do not know of a particular field wherein this is better illustrated than in that of marine sports, when one sees what the water lover can now get in the way of a cruising launch for less than $1,000. It was only a few seasons ago that the prospective purchaser of a cruising launch would have been obliged to dig down into his bank account and extract therefrom an amount extremely close to $1,500 to secure, at first hand, anything that resembled a boat on which he could spend from two days to a month in any degree of comfort, and be able to lay alongside of a club float without feeling ashamed of her appearance. Furthermore, the running expenses of such a boat would have been a considerable addition to his expense account.

BOW VIEW OF 25-FOOT RAISED-DECK CRUISER WITH A SQUARE STERN.

But what is the use of talking about the past? It is the present we are living in, and it is the purpose of this article to tell the man who really wants to know just what he can get in something that is attractive, seaworthy and comfortable, and still keep well within the bounds of that thousand dollars which I have already mentioned. That he is able to do this at all has been made possible by improvements in motors, standardization in fittings and equipments, and, to a very large degree, by the inauguration of the raised-deck type of hunting cabin cruiser. Not that the writer claims that the raised-deck type is in every point better than the older form of raised trunk hunting cabin; but the construction of the newer design is, foot for foot of over-all length on moderate-sized craft, more economical, and gives a stronger boat. There are no deck timbers to be broken up, for frames and side planking are carried right up to the height of the cabin roof, and there are no seams around the trunk house, which mean either careful and expensive work or a certainty of leakage in a heavy sea. Then, too, the raised deck gives the entire forward part of the boat for accommodation and storage purposes, and makes a high freeboard—a mighty important item on a little boat that is intended to negotiate rough water.

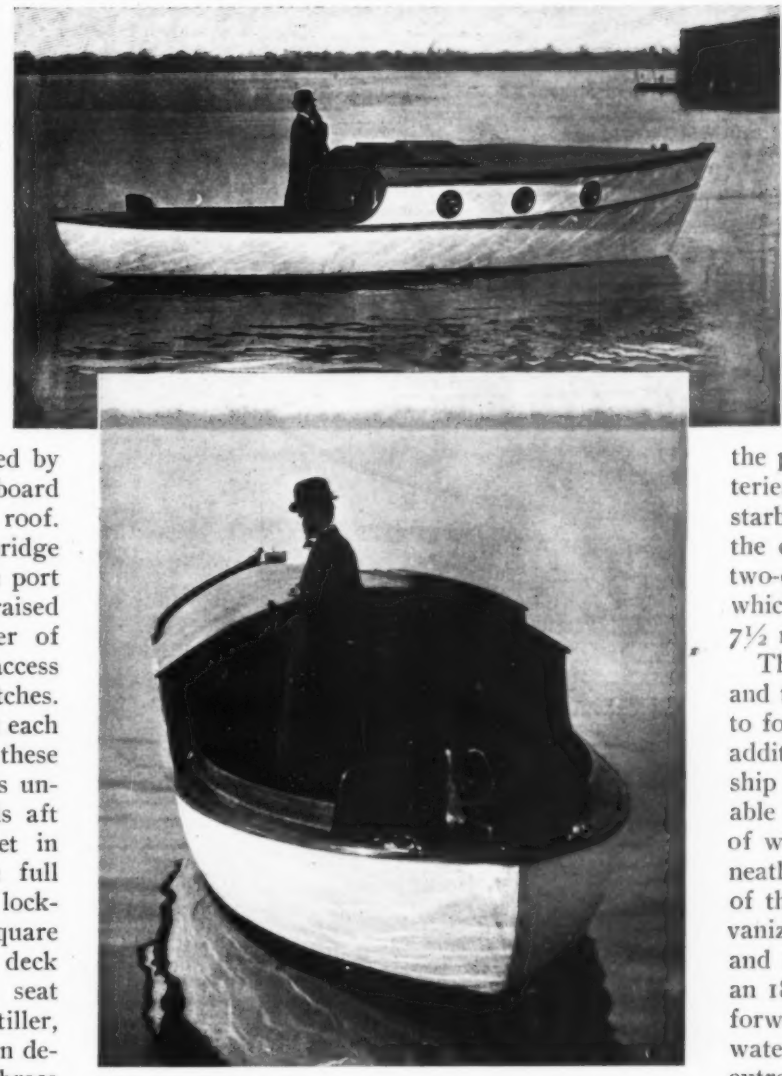
A 21-foot boat is about as small as a man can use for cruising purposes with any degree of comfort, and comfort is no inconsiderable item, when one comes to consider that a man cruises for the pleasure of the sport. But in a 21-footer, he who has $600 at his disposal can secure a tight little craft, in which he can eat, sleep and cook, and one which will take him pretty nearly everywhere that a craft of that size has any right to go at a speed ranging from 6 to 7 miles an hour, according to how well he manages his engine and how much care he gives it. The inboard profile and accommodation plan which is shown will tell just what may be had for $600. She is of the raised-deck type with a plumb bow and a square transom, with an oak rudder hung on the outside.



A 21-FOOT CRUISER. HER 4-HORSEPOWER, SINGLE-CYLINDER ENGINE WILL GIVE HER BETWEEN 6 AND 7 MILES AN HOUR. SUCH A BOAT WOULD COST $600, AND TWO MEN COULD CRUISE IN HER QUITE COMFORTABLY.

Here is a craft that is all boat, and not much space is wasted in overhangs at either end. Her power is furnished by a 4-hp., single-cylinder, two-cycle engine of the reversible type, which may be controlled from the deck. She is 21 feet in length over all, and 20 feet 5 inches on load waterline. She has 6 feet 2 inches beam, and draws but 22 inches of water, with a freeboard at bow of 3

feet 6 inches, amidships of 1 foot 11 inches, and at the stern of 2 feet. Her cabin is 9 feet long and has 5 feet headroom. The fore part of the cabin is given up to shelves and lockers, above which is the chain locker, for storage of the cable. She has transoms along each side and across the forward end of the cabin for sleeping purposes, and these have storage lockers underneath. Ventilation is obtained by means of a cowl ventilator on the forward deck. This cabin is entered by a companion hatch just to starboard of the center line of the cabin roof. Aft of this companionway is a bridge deck with steering wheel on the port side. Aft of this bridge is a raised compartment, under the center of which is the engine, to which access is had by means of sliding hatches. The gasolene is stored in tanks at each side of the engine, and over these tanks are high seats with lockers underneath. The cockpit proper is aft of the engine box, is 6½ feet in length, with seats running the full length of each side, with storage lockers underneath. The cockpit is square at the after end, and the after deck may be used as a steersman's seat should he elect to steer by the tiller, which is arranged to be used when desired. The steering gear is of brass and mahogany, with a flexible wire cord leading aft above deck to the tiller. In such a boat as this two men can find comfortable accommodations, and she can be very easily handled by one. She does not possess the luxury of a separate galley, but a small alcohol vapor stove can be used in the cabin without any unpleasant odor from the fuel. She is a good deal of boat for her size and price.

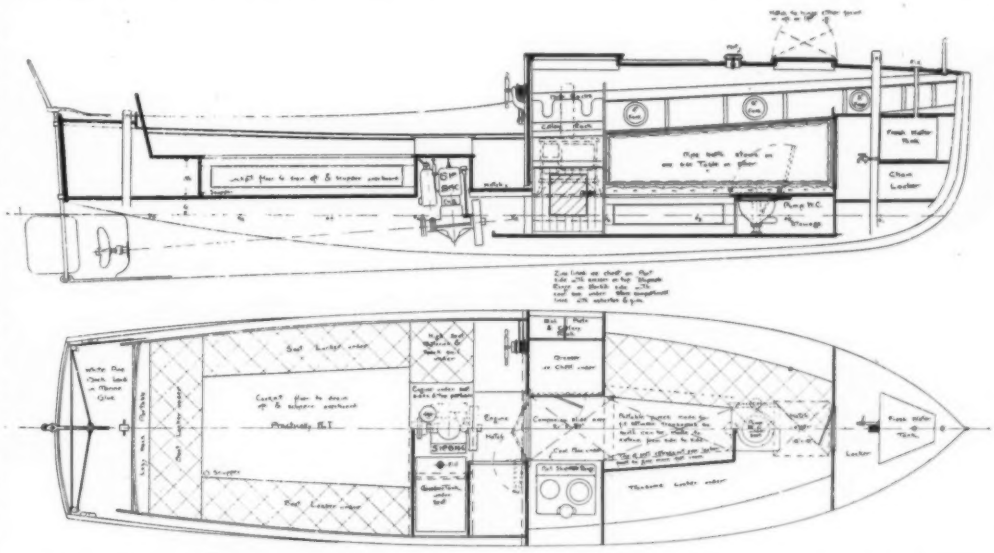


TWO VIEWS OF A 28-FOOT COMPROMISE STERN CRUISER. THESE PICTURES GIVE A GOOD IDEA OF THE PROPORTIONS OF CABIN AND COCKPIT, AND THE COMFORT OF THE LAZY-BACK STERN SEAT.

If the prospective purchaser is willing to spend $75 more for his craft, he can get the full worth of the difference in a somewhat larger model of similar lines and construction. This boat will be 25 feet over all, 22 feet 6 inches on the waterline, 6½ feet beam, and draws 18 inches of water. Her forward deck is 12 feet long, and, under this, there is 8½ feet of available cabin room, as against 6½ feet in the 21-foot boat. This gives room for a dresser and ice chest at the after port side and a stove space at the after starboard side, separated from the main cabin by bulkheads, which allow them to be curtained off, and also permit the cook to stand under the companion slide while the stove is in commission—a very comfortable arrangement for warm-weather cruising. The cockpit is 11 feet long, is self-bailing, and at its forward end is a bridge, behind which is a raised box running entirely across the boat. Underneath the port side of this box are the batteries and spark coils, and under the starboard side the gasolene tank. In the center is a 5-hp., single-cylinder, two-cycle motor of the reversible type, which gives her a speed of from 7 to 7½ miles per hour.

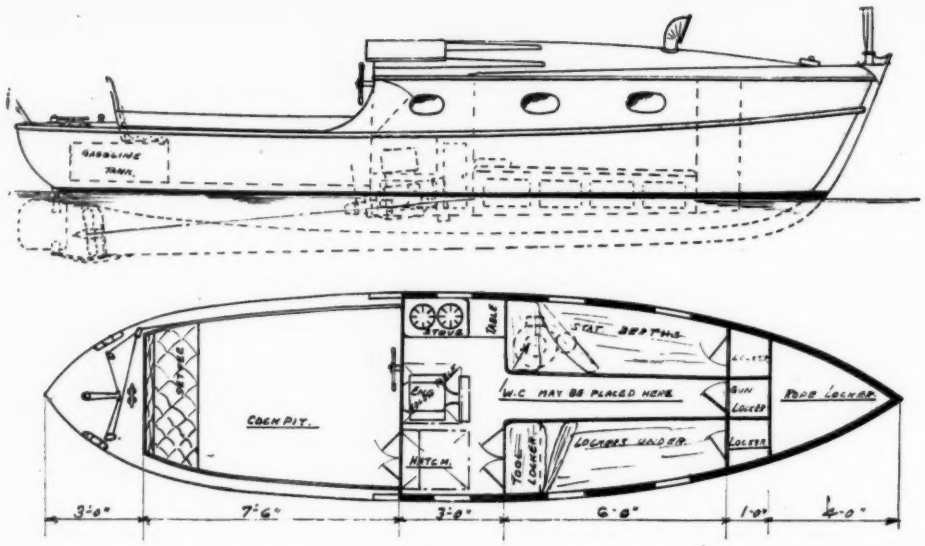
The engine is reached by a hatch, and the 'thwart-ship box just referred to forms a very comfortable seat. In addition to this she has a wide 'thwart-ship seat in the stern, with a comfortable lazy-back and two side seats, all of which contain locker space underneath. Instead of the wooden rudder of the 21-footer, she has one of galvanized plate. The cabin has two 5-inch and four 6-inch fixed port lights and an 18 x 18-inch square hatch over its forward portion. She has a fresh-water tank and a chain locker at the extreme bow, with considerable storage space between them and the forward cabin bulkhead. Although the plans indicate her as being fitted with plumbing, stove and refrigerator, these are extras to be supplied by the purchaser.

Another 25-foot craft, in which the motor is housed within the cabin, and which, without plumbing, can be procured for $564, is illustrated herewith. Of the raised-deck type, her cabin is so arranged as to give four good-sized lockers for clothing, oil skins, supplies, etc. In the bow of the boat is space for a fresh-water tank, aft of which comes the cabin proper, 7 feet 5 inches in length, containing a transom berth, 6 feet 4 inches in length, on each side, and so arranged that the space between them may be filled in to accommodate a third sleeper.



A 25-FOOT, TWO-MAN CRUISER WITH A 5-HORSEPOWER, SINGLE-CYLINDER ENGINE. SHE MAKES BETWEEN 7 AND 7½ MILES AN HOUR AND COSTS $675. SHE IS AN ENLARGED MODEL OF THE 21-FOOTER.

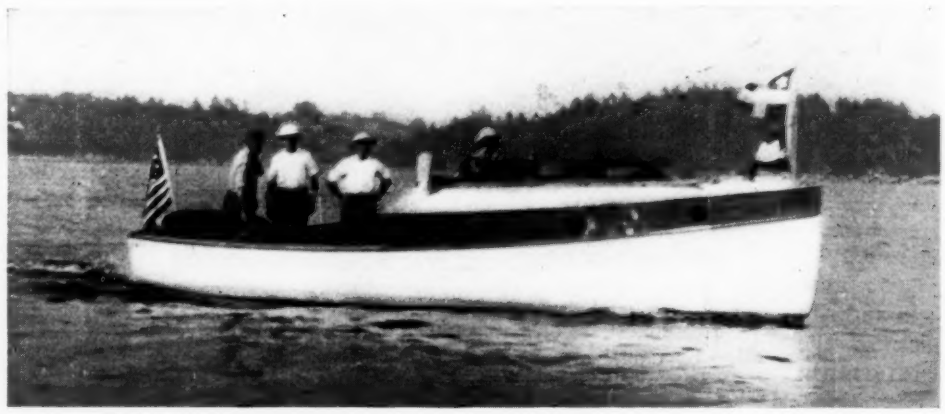
Aft of these berths are two full-length clothes closets 13 inches in width. Aft of these clothes closets



A 25-FOOT CRUISER WITH SLEEPING ACCOMMODATIONS FOR TWO. SHE HAS A TWO-CYLINDER, 8-HORSEPOWER MOTOR, WILL MAKE 8 MILES AN HOUR AND COSTS $750.

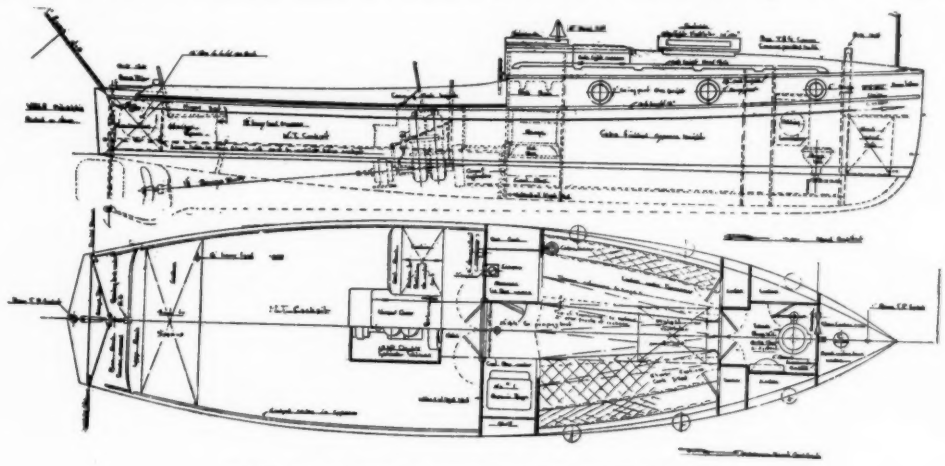
is a combination galley and engine room 4 feet 4 inches in length, which may be curtained off from the main cabin. On the port side of this is space for the ice box, dish locker and stove. On the starboard side are two lockers, one just inside the companionway affording a convenient place for the storage of oilers. The engine, 6-hp., single-cylinder, occupies the center of the engine room, and is close to the after bulkhead. Companion is on the starboard side. The cockpit is 9 feet 2 inches in length, with seats on three sides, the starboard one being broken to allow access to companionway. Her general dimensions are as follows: 25 feet over all, 6 feet 6 inches beam, 30 inches draft; and she has 4 feet 6 inches headroom in the cabin. The cockpit is self-bailing. Gasolene tanks are located under the seats and drain overboard. She has a brass and mahogany steering wheel located at the center of the after cabin bulkhead. She may also be steered by the tiller, reached by dropping the lazy-back of the after cockpit seat. A hatch over the forward part of the cabin does much to make easy the handling of anchor and cable.

If a somewhat different arrangement is preferred, it may be had in another 25-footer for the sum of $750. This boat is also of the raised-deck type, with a slightly raking bow and compromise stern. She is 25 feet over all, 6 feet 6 inches beam, 2 feet 3 inches draft. Her power consists of a two-cylinder, two-cycle, slow-speed, heavy-service engine, rated at 8 horsepower, and equipped with friction reverse clutch, which is a great convenience. This engine gives her a speed of 8 miles an hour. Starting from the bow, her accommodations are as follows: First comes a chain locker, 4 feet in length; then 12-inch locker space, divided by two partitions into three lockers, the central one of which serves admirably for guns. Next is a berth space of 6 feet 6 inches, with lockers under the berths. Aft of this is the engine room, on the port side of which is space for the stove and a small table. On the starboard side is a companion hatch leading to the cockpit, which is 7 feet 6 inches in length. The engine and galley space, it may be remarked, is 3 feet in length, and may be curtained off from the forward portion of the cabin. There is a settee with a lazy-back across the square after-end of the cockpit, and under this and the after deck is the gasolene tank of 60 gallons capacity, giving her a cruising radius of 400 miles on one filling. This tank is fitted with partitions, to prevent the gasolene from swashing around in a seaway. She has six sliding oval windows with heavy plate glass, four of which light the cabin and two the engine space. She has a cowl ventilator on her forward deck. The motor is so installed that the reverse lever is within easy reach of the helmsman. The throttle and spark controls are located on the after cabin bulkhead, making her an ideal one-man craft. Her cockpit is of the self-bailing type, and her cabin is canvas-covered, with oak foot-rail on each side. The interior of the cabin is paneled in pine or cypress and finished in white.

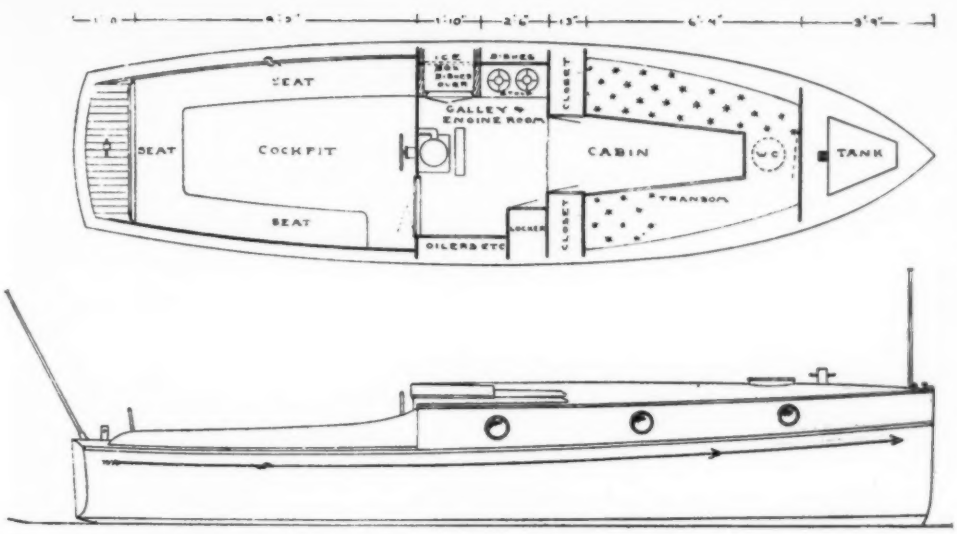


A 30-FOOT CRUISER WITH A 10-HORSEPOWER, DOUBLE-CYLINDER MOTOR. SHE MAKES 8 MILES AN HOUR, MAY BE HANDLED BY ONE MAN AND COSTS $990.

If something rather larger is desired, and there is an extra hundred dollars in the treasury to be expended, there can be procured for $850 a 28-foot, compromise-stern cruiser with sleeping accommodations for four people. This boat is practically the 25-footer just described, but lengthened by 3 feet, making her 28 feet over all, 6 feet 9 inches beam, and 24 inches draft. In the extra 3 feet of length there is room for some improvement in the arrangement. In the extreme bow there is a 6-foot storage space containing a 75-gallon gasolene tank. Aft of this comes the saloon, with berths on each side and a 'thwart-ship seat forward. Aft of this, on the



PLANS OF 30-FOOT, V-STERN CRUISER SHOWN ABOVE.



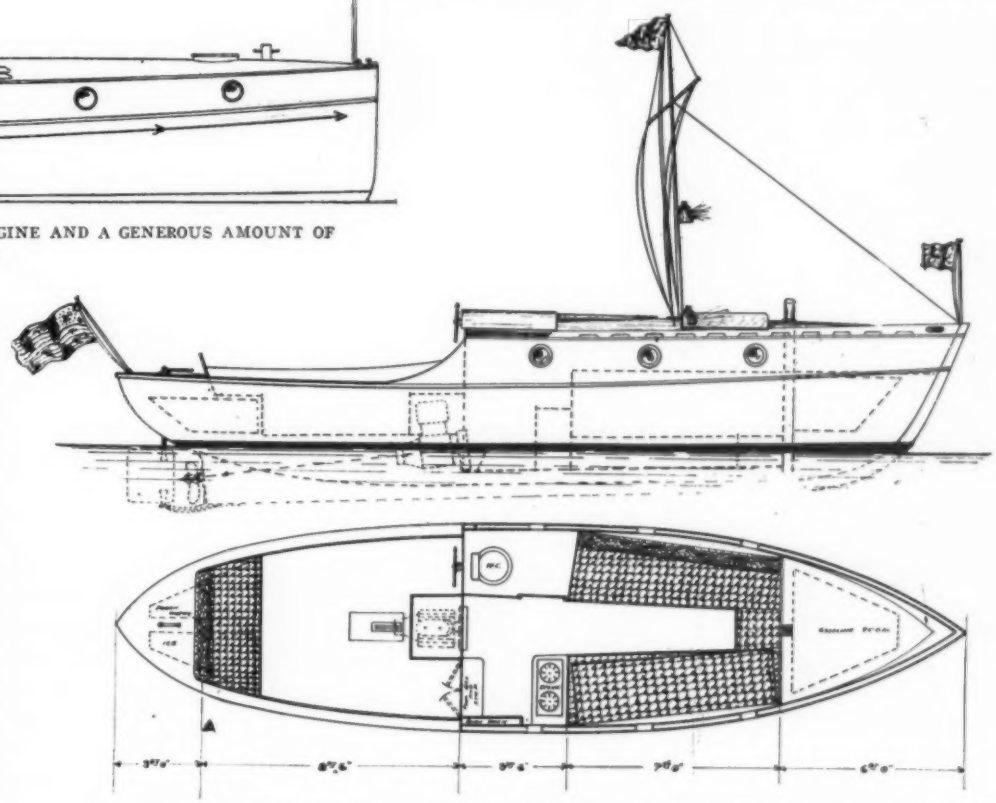
A 25-FOOT, $564 CRUISER WITH 6-HORSEPOWER ENGINE AND A GENEROUS AMOUNT OF LOCKER SPACE.

starboard side, is space for stove and dish-rack. On the port side is a lavatory 3 feet 6 inches long. The engine has been moved back out of the cabin, and is located beneath a box projecting above the forward end of the self-bailing cockpit floor. Entrance to the cabin is by means of a hatch on the starboard side, the single step into the cabin serving as a tool box. The cabin proper is 7 feet in length, and that of the stove space 3 feet 6 inches. The cockpit is 8 feet 6 inches long, and the engine box can be used as a seat for the steersman. The after end of the cockpit is square; across it extends a wide transom with lazy-back, beneath which, and extending under the after deck, is a fresh-water tank on the port and an ice chest on the starboard side. By a comparison of her cabin with that of the 25-footer of similar model, it will be seen how much a few feet in the length of a boat means in the way of additional living room.

If one is ambitious for something larger, however, and still wishes to keep within the thousand-dollar limit, he can, for just $10 short of this amount, become the owner of a 30-footer, whose 10-hp., double-cylinder, two-cycle engine gives her a speed of about 8 miles per hour.

This boat has 7 feet 9 inches beam and is 30 feet 2 inches on the waterline. Her draft is 2 feet 6 inches. The freeboard at bow is 3 feet 10 inches and at stern 2 feet 6 inches, while the headroom is from 4 feet 6 inches to 5 feet. She has a plumb stem, "V"-shaped stern, and a self-bailing cockpit, in the center of which is an engine box with a hinged cover, through which the reverse lever protrudes. On the port side of the cockpit is a seat with a lazy-back, under which the batteries and coils are stored, and directly in front is the steering wheel. A lazy-back extends across the stern end of the cockpit, with locker space

(Continued on page 60.)



A 28-FOOT, COMPROMISE-STERN CRUISER WITH 8-HORSEPOWER, TWO-CYLINDER ENGINE. COSTS $850 AND HAS SLEEPING ACCOMMODATIONS FOR FOUR

The Racers

By ALLAN O. GOOLD

THERE is the boathouse basking in the warm sunlight of mid-July, and across the end of the float lies moored a vision to delight the heart of the most stolid motor-boat man.

Some 35 feet is the vision, from her knife-like stem, which is cleanly dividing the tiny waves dancing along before the freshening breeze, to the mahogany transom, upon which, in letters of gold, is the single word Princess. The narrow hull rests upon the water as lightly as thistledown. Every line tells of speed. The long, easy entrance, the straight stem, its bronze cutwater carried out to almost a razor edge, the slightly rounded transom, the gracefully indrawn quarters—all proclaim the thoroughbred.

Nothing better for color than that glossy black above water, with spotless white below—mahogany decks, coamings and transom to add a touch of richness, with the glint of polished brass to give life to the whole!

Raise those engine hatches, please! That's it! A six-cylinder machine, as you see, and an outfit to be proud of! She'll give 90 horsepower at 900 turns. You'll have no trouble handling it with your last season's experience. While I am looking over the machinery you can fill the gasolene tank; it is under the short deck between the cockpits. Yes, 30 gallons will be ample. No use overloading her. There's the tunnel and chamois skin in that

"FOLLY, RUNNING ACROSS THE HARBOR WITH A WAKE LIKE A SIDE-WHEEL FERRY BOAT."

port locker. The chamois lets the gasolene through, but not the water. One cannot be too careful about the gasolene supply. Open that stop valve under the tank and the sea cock there in the bilge.

Here are cork jackets if we should need them, and a ring buoy to throw should one of us get overboard. This piece of tin with our racing number goes forward in place of the club burgee. Bend it to the regular staff.

While you are forward I will fill the oil reservoir and squirt-can. Quick-running machinery needs plenty of lubrication. Now go over the tiller ropes carefully, please, and see that they are not worn anywhere. I know that wire or chain is often used, but I prefer Samson cord soaked in linseed oil. Many a race is lost through faulty steering gear, and wire or chain often part when apparently as good as new. Now we will get the anchor and cable ashore; the cushions and carpet we will leave on the float, too. We want as little extra weight as possible.

Boom! The preparatory gun. Fifteen minutes more.

Here's Folly running across the harbor with a wake behind her like a side-wheel ferry-boat. Looks well painted white. She's our hardest proposition, with that new hundred-horse motor.

How is this for the dynamo belt—tight enough? All right! We may as well start her up. Throw out your clutch, there! Spark lever all right? Where's that starting bar?

There—the carburetor's doing better now! Forward cylinder misses, though—the contact looks dirty. Let me take your knife. Good enough! She never ran better than that. Cast off there forward, and we'll run up behind the line! Better run close to the judges' boat on the start; the water's deeper out there. Here's the place for us. Back her now—all right! Let her turn up to 600 or so till we get the gun. See the boats! Every launch in the bay must be here for the race. How's the time?

Two minutes—one minute—thirty seconds—Boom!

Let her go! And a rattling good start, too. Only Hawk has crossed ahead of us. Here's Shark to starboard; we're leaving her. Folly isn't so dangerous, after all, it seems. Think they are holding her back much?

It looks breezy out there in the ship channel; white caps making up fast. Give me that oil coat, will you? Thanks!

Folly's creeping up, sure enough; move that spark ahead—so! Makes a difference, doesn't it? I think we can hold her now.

Jove! but it's getting wet. A few more like that and—better slow her down a little; we don't want to sink her. Bail when you can find time. Here's where Folly's freeboard helps her out. She is right in her element in this nasty chop. She's creeping up faster—now she's abreast of us—she's passing us—there's the name on her stern! Those eight exhausts roar like a Gatling gun. It certainly *is* hard luck, but the race isn't finished yet. See! there's the mark boat. I'll save every inch on the turn. Folly's rounding now. If we can't cut down her circle I'll hang my head with shame. Slow her down—hard-a-port—there—we're round! Laid over well, but didn't ship a drop.

Easier going on this stretch. If you dare advance that spark a notch or two we might—yes, that's it; we are closing up on her now. I think we might safely speed her up a little more yet—here under the lee of the breakwater. Good! 900 turns, if she's making one. Twenty-four knots? Nearer twenty-five. Makes one's teeth chatter, doesn't it? Better take a look at that oiler, boy, and see if she is getting all she wants.

Smooth water here. Another notch, if she'll bear it, and—we are abreast of her! That's the judges' boat with the flags; now for it—the last notch—God! how she shakes. If everything holds we'll pass her—here's the line—that bunch of boats—we've got her!—we've got her! Boom!—ahead by half a length!

EVERY LINE, FROM THE KNIFE-LIKE STEM TO THE MAHOGANY TRANSOM, TELLS OF SPEED.

THE BEGINNING OF A DERELICT'S CAREER. BARKENTINE WHITE WINGS SIX HOURS AFTER SHE HAD BEEN ABANDONED IN THE GULF STREAM ON NOVEMBER 6, 1906.

Vagabonds of the Sea

THE WANDERINGS OF FAMOUS DERELICTS IN THE NORTH ATLANTIC—THOUGH CHARTED BY THE HYDROGRAPHIC OFFICE, THEY ARE A CONSTANT MENACE TO SHIPPING—WHAT THE GOVERNMENT IS DOING TO RID THE SEA OF THIS DANGER

By STUART STEVENS SCOTT

OF all the perils of the sea the derelict of the Atlantic remains, as it ever has been, a menace to all who fare on the deep, whether in yacht, windjammer or million-dollar greyhound. Wallowing, flailing, ever plunging onward in the grip of some one of the manifold currents which flow through the deep, these sodden wanderers, green with the clinging sea moss, gray with the washing of waters that never cease, their spineless hulls sighing and working, seem to epitomize all the hidden terrors of the desolate sea.

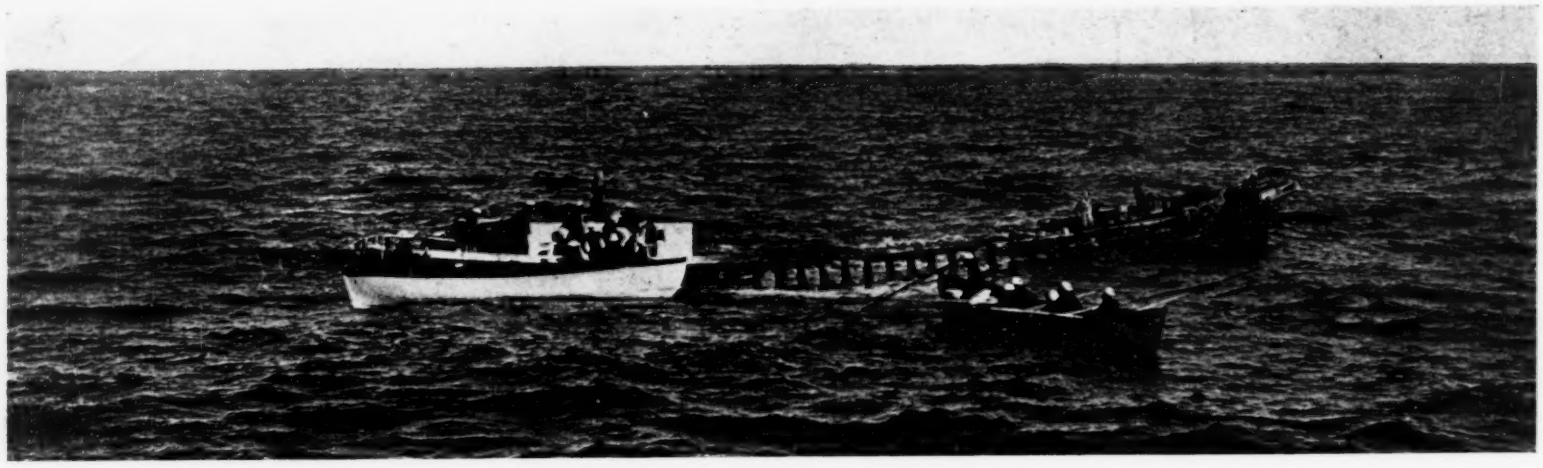
Floating sometimes below the surface of the water, heavy as so much lead, the bows of many a staunch steamship colliding with them have been rent apart like so much tin; and the vessel, a moment before speeding bravely on her course, prepares for the last long dive to that bourne of "ships that never return."

Even modern shipbuilding, while setting at naught many of the dangers which mariners used to face when they left port, has proved not altogether competent to deal with this danger—as old as navigation is old. It was the gigantic Mauretania—next to the Lusitania the swiftest, and, with the Lusitania, the greatest ship that ever breasted the salt gale—which, while steaming proudly for New York, got a derelict twisted in her propellers, with the result that she will be out of the transatlantic service nearly a year undergoing repairs.

TOWING A DERELICT INTO PORT. THESE WANDERERS OFTEN PROVE RICH PRIZES TO THEIR FINDERS.

Week in and week out captains of vessels arriving at various ports in this country bring with them stories of having sighted derelicts at sea. These are carefully noted by government hydrographers, and each month they issue a chart, in which the positions of newly-discovered derelicts are noted and the courses of wanderers hitherto reported are traced.

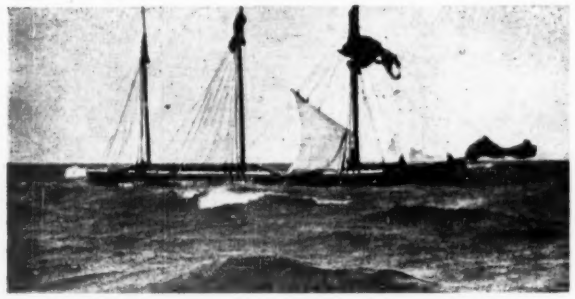
The trouble with such charts is that



THE CREW OF A UNITED STATES REVENUE CUTTER PREPARING TO BLOW UP A DANGEROUS WANDERER.

derelicts are never still. Seen in one locality by one steamship, a month or two months may elapse before they are next reported, and then they are hundreds of miles away from the spot where they were first seen. Mostly schooners, lumber laden, they never sink; and when the cruiser Atlanta some years ago endeavored to send one to the bottom by ramming with her steel bow, she not only failed in her purpose, but limped into port with her great prong of steel twisted twelve degrees to starboard.

A schooner abandoned off Hatteras may go anywhere. She may take the southeast current, which trends towards the Azores; she may plunge along up the coast, and, finally, lie lurking amid the shrouding mists of the Grand Banks, waiting to work her harm. They are utterly hated, deeply feared by every man who treads a ship's deck, and with the best of reasons.



ABANDONED IN A HURRY. HER TOP HAMPER IS STILL IN GOOD SHAPE.

It is generally believed in maritime circles that the loss of the French steamship Ville de St. Nazaire, which went down with a large number of her passengers and crew off Hatteras, was due to the vessel striking a derelict, for her master reported to the owners that the steamer, as she fell into the trough of a wave, struck an obstruction and almost at once began to fill from a hole under her engines.

For many years the shipping interests of this country have urged the government to prosecute a vigorous warfare against this menace, and the campaign has been carried on by the Revenue Cutter Service, which has done fine work. That there shall be no cessation in the work, the government has had built at Newport News a vessel whose sole mission is that of derelict destroyer.

The destroyer, which resembles a revenue cutter in general appearance, will be manned by revenue officers, and will be under the control of the Treasury Department. She will be equipped with a torpedo tube, and will also have a powerful wrecking pump and heavy towing bitts, so that should she run across a derelict in such condition as to warrant, she can tow her into the nearest port. She has also the most complete life-saving equipment of any vessel yet built.

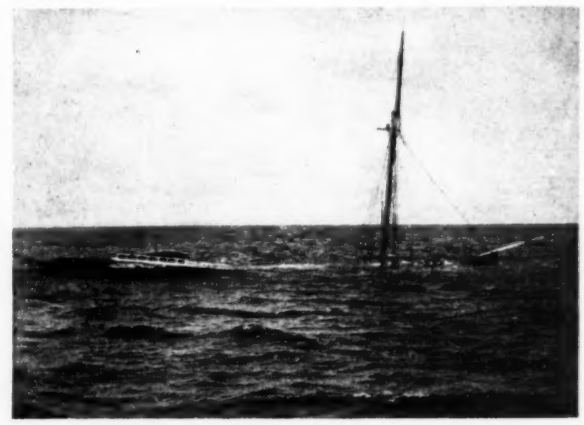
After being abandoned many derelicts prove to be quite seaworthy, and, as such craft usually have cargoes of sufficient buoyancy to keep them afloat, they are valuable prizes. The four-masted schooner Augustus Welt was abandoned in a storm off Hatteras last fall, and a day or so later she drifted so close to Diamond Shoals Lightship that a crew from the latter was placed on board. Later, the revenue cutter Seminole towed the Welt into Moorehead City, N. C.

About a year ago the Merchants & Miners' steamship Merrimac picked up the derelict schooner Job H. Jackson a few miles east of Frying Pan Shoals. This was the second rough experience of the Jackson, as a few years ago she was sent to the bottom in a collision in Chesapeake Bay.

Both the Welt and Jackson were lumber-laden, and it is just this class of vessel that makes the derelicts. With their hulls packed with pine wood, they will hold together long after they are awash; and the crews cannot be blamed for leaving them when their spars are gone, their cabins flooded and the deadly Diamond Shoals are under their lee. Were they to miss the opportunity of being taken from their wave-washed vessel and stay on, trusting to the storm abating, they would be taking a long chance on not fetching up on the shoals and being lost in the boiling surf, through which no small boat can live.

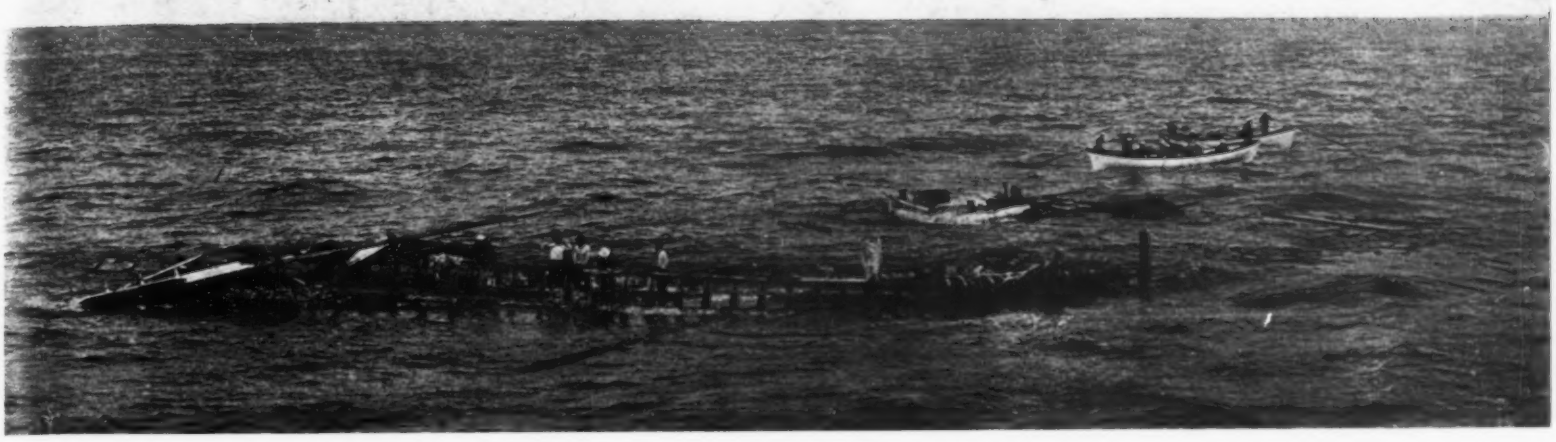
If these lumber-laden craft, after being abandoned, would go on the shoals, all would be well, for they would quickly pound to pieces; but many of them do not, and some of these vagabonds have left behind them records of remarkable wanderings covering many thousands of miles.

The Fannie E. Wolston, an American three-masted schooner, holds the world's record for long drifting after abandonment. Lumber-laden, she was left by her crew off Hatteras, and from then on she was sighted forty-four times, and her courses on the hydrographic chart indicate that she traveled 9,115 miles during the four years she floated. She finally disappeared in a storm off the New Jersey coast.



THE FAMOUS DERELICT FANNIE E. WOLSTON. A WANDERER OF FOUR YEARS, DURING WHICH SHE DRIFTED OVER 9,000 MILES.

The H. J. Cottrell was another long-drifter, being afloat about eight months. She was abandoned off Diamond Shoals, and, before leaving, her crew set her on fire. Two passing vessels later tried to burn her, and then the British cruiser Partridge fell in with her. After using her as a target and leaving her riddled, the English skipper reported that she would break up in the first bit of a blow. She



THE RESULT OF THE FIRST EXPLOSION. NOT MUCH DAMAGE DONE EXCEPT TO THE CABIN AFT.

did not, however, and went through several storms without, apparently, being any the worse for them.

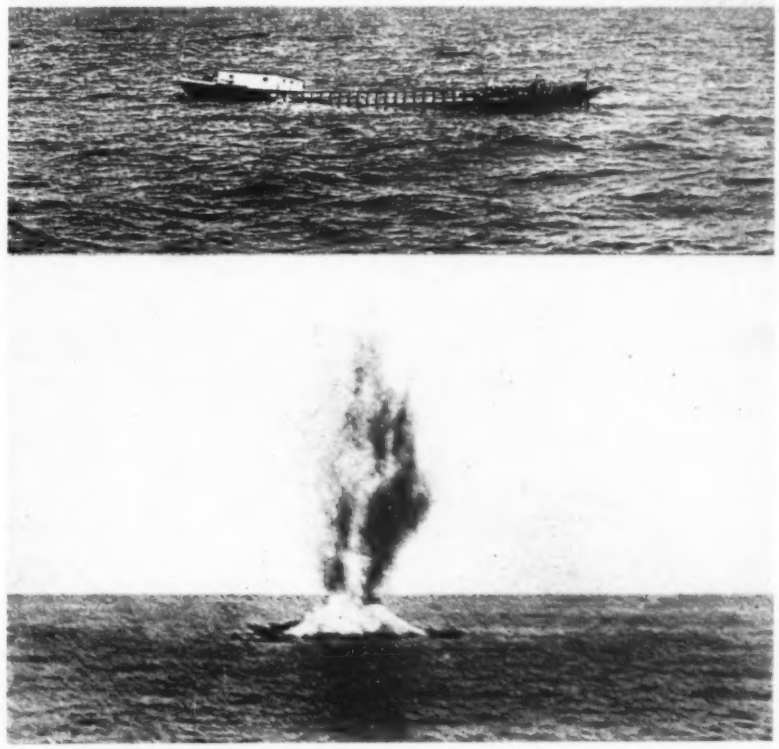
After drifting seaward and completing an irregular course of 1,800 miles, the Cottrel again bobbed up off Hatteras, and, though the Navy Department sent tugs and revenue cutters after her, she escaped only to disappear from the sea a month or so later.

The W. L. White, another three-masted schooner, abandoned off Absecom in the March blizzard of 1888, finally came to her end ten months and ten days afterwards by going ashore on Haskier Island, one of the Hebrides group to the north of Scotland, thus completing a voyage of about 5,000 miles.

The three-masted schooner Twenty-one Friends, eight months after she had been abandoned near Cape Henry, was sighted close to the English shore, having drifted 3,325 miles. Then she disappeared, presumably breaking up.

There have been scores of these lumber-laden derelicts during the past fifty years, and they have all drifted about more or less. Not a few have records of two, three or four months; but the majority have lived less than two months, because of the vigilance of the Revenue Cutter Service, which has sent dozens of them to Davy Jones' locker.

The usual method of destroying a derelict is to place a heavy charge of guncotton amidships and thus blow the vessel apart. Sometimes one charge is sufficient, but often it will take two or three to break up the hull enough to allow the cargo to float out and drift away.



THE LOW, DISMASTED DERELICT, WITH DECKS AWASH, BEFORE THE REVENUE CUTTER BEGAN HER WORK OF DESTRUCTION.

WHEN THE CUTTER'S WORK IS FINISHED. THE RESULT OF A WELL-PLACED CHARGE OF GUNCOTTON.

Probably the most remarkable derelict was the British steamer Dunmore, an iron vessel that for three months lay directly in the path of transatlantic liners and dodged a fleet of five British warships that was sent to tow her into port or sink her. She was abandoned in a sinking condition about 600 miles off Cape Cod during the latter part of December, 1905, and, as her crew supposed that she would go down in a few minutes, they neglected to open the seacocks. Twice afterwards steamers fell in with her and tried to tow her; but each time the lines parted, and she was abandoned. The St. Louis passed her close aboard one night, and steamer after steamer reported her until twenty-two reports were received. The twenty-third report has not yet been made, and it is certain that she is now on the bottom.

A number of derelicts have been picked up from time to time, and, inasmuch as the salvage in each instance was about one-half of the value of vessel and cargo, the prizes have proved rich ones. As a rule, every shipmaster keeps in mind the possibility of picking up a derelict, thus earning something to set aside against his retiring day.

On the other hand, when one glances down the list of missing ships, it is not unreasonable to believe that collisions with derelicts have been responsible for the loss of some of them, especially those well-found ships that left port well provided against the ordinary contingencies of a ten or twelve-day voyage across the Atlantic.

While derelict vessels are always a menace, there never has been such a general scare in shipping circles as there was in December, 1887, when the steamer Mirando put into New York and reported that the log raft she was towing from the Bay of Fundy had broken adrift off Nantucket Shoals Lightship. This raft was made up of 27,000 trunks of trees, ranging from 50 feet to 100 feet in length, each bound with chains into a cigar-shaped mass 560 feet long, 65 feet wide and 38 feet deep, drawing 19½ feet of water.

The United States ship Enterprise was hurried to sea to warn all incoming vessels and to try to capture the raft, while the New York Maritime Exchange sent warnings far and wide. Several revenue cutters and wrecking tugs were sent to look for the raft, but they were unsuccessful. A gale finally destroyed it, and the logs were scattered. The building of a vessel especially for the work of destroying derelicts means that this Government is taking the lead in an effort to remove one of the greatest dangers to the men who go down to the sea in ships.

The Vital Part of a Marine Motor

By HAROLD WHITING SLAUSON

Diagrams by the Author

ANY person who has had experience with gasolene marine engines will testify to the truth of the statement that ignition and wiring troubles are responsible for nine-tenths of the motor breakdowns. This is natural, as the ignition system is the only complicated part of a marine motor, and although modern design has greatly simplified the mechanism, there is still opportunity for sufficient trouble in the batteries, coil, plugs and timer to keep anyone but an expert "guessing" for several hours before he can discover the real seat of the disturbance. When to the faults of poor adjustment or imperfect contact is added the trouble liable to be incurred from insufficient insulation or a few stray drops of water, it will be realized that a thorough knowledge of ignition systems in general may oftentimes prove of great assistance to a man who operates his own motor boat.

It is beyond the scope of this present article to deal with all forms of marine motor ignition, and so the following hints, descriptions and diagrams will be confined to the ordinary "jump spark" or high-tension system which is in use on the majority of small and medium-sized motors. Although many of the completed machines leave the factories with placards calling attention to the fact that every adjustment has been properly made, it is well to examine carefully the various parts of the ignition system, to make sure that all connections are secure and that no damage has resulted in transit. Even though everything is found in first-class condition, this does not guarantee that these parts will remain in good working order without more or less attention on the part of the operator.

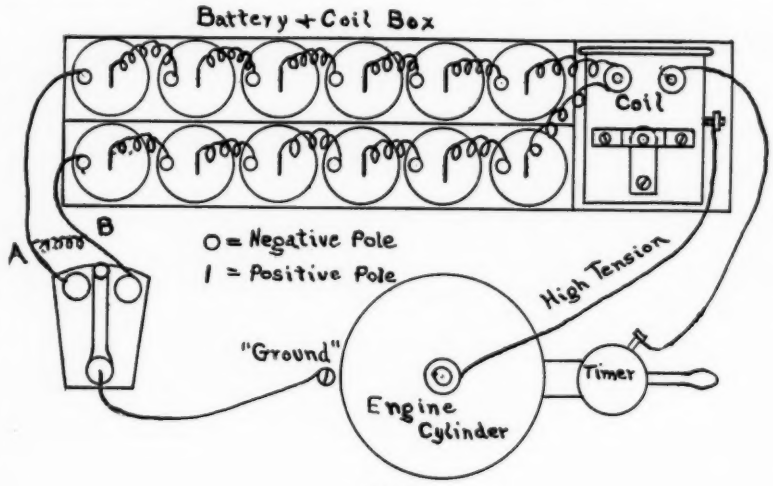


FIG. 1.

The simplest form of jump spark ignition for a single-cylinder motor consists of a set of dry batteries, a coil, a spark plug, a timer, a switch and the necessary high and low-tension wiring. The first of the accompanying diagrams shows the relation of one of these parts to the other in the electrical circuit.

As the spark in the ordinary high-tension system of ignition is formed by a voltage varying from 30,000 to 50,000, it is evident that the proper insulation of the wires carrying the high-pressure current is of the utmost importance. One of the greatest troubles to be met with in the jump spark is the liability of the current to short-circuit and return by way of the metal parts of the motor before it reaches the spark plug. These short-circuits may be caused by a break in the insulation, the wear from a moving part of the motor coming in contact with the wire, or even by a few drops of gasolene, oil or water placed on the covering. To guard against these troubles, the best kind of insulated wire is none too good for the high-tension circuit; and even though its cost may appear to be excessive, its usefulness will surely pay in the end. The best wire for this purpose is covered with rubber to a thickness of about one-quarter of an inch, and over this is placed a woven silk or linen covering which has been treated in such a manner as to render it as nearly waterproof as possible. Although this costs from ten to twenty cents a foot, it is only in rare cases that more than 5 or 6 feet for each cylinder will be required on the high-tension circuit.

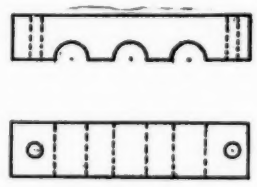


FIG. 2.

Although this wire is so thoroughly insulated, it should not be allowed to come in direct contact with any part of the metal of the boat or engine; and in case the motor is of more than one cylinder, the conductor may be held in place by wooden cleats, as shown in Fig. 2. These are made from small pieces of hardwood, and are notched to accommodate as many wires as necessary. Two screw holes should be made in each, as shown in the drawing, and these cleats may be fastened to the woodwork of the boat, or even to the motor itself. None of the wires should pass through any place where oil, grease or gasolene is liable to accumulate, for the action of these hydrocarbons on the rubber covering will cause more rapid deterioration than almost any other substance.

In case the boat is of the open type and the motor is unprotected from the rain or spray, it is well to cover all exposed wires with several coats of shellac; this will be found to be of great assistance in preventing short-circuits due to moisture. Of course, this shellac coating will not serve to prevent a short-circuit in the spark plug, and many an open boat has been forced to stop in a heavy rain because of this trouble. An open umbrella or other suitable canvas covering will, however, often shed enough water to keep the motor running in the heaviest rain; and the writer has often found that an oilskin hat, or "sou'wester," placed over the top of the engine and spark plug, has served the purpose.

Although it is often impossible to keep the wires and spark plugs absolutely dry, no water should ever be allowed to come in contact with either the coil or batteries, for moisture will so rust and corrode the one and so weaken the other that these most delicate and expensive parts of the ignition system will be temporarily, if not permanently, ruined. If the boat is provided with lockers, this is naturally the best location for the batteries and coil, and they should be placed in a box made with compartments, as shown in Fig. 1. In case the boat is not equipped with lockers, the batteries and coil may be placed in the box under a seat and protected from the wet by a rubber flap attached to the end of the seat and fastened down over the open end of the box.

As stated in the preceding paragraph, the coil is the most delicate part of the ignition system, and, as such, is apt to require considerable care in the matter of adjustment. It operates on the principle of the induction coil, which is familiar to everyone who has studied elementary physics, and is used to transform the high-amperage and low-voltage electric current of the batteries to a current of but a fraction of an ampere and having from 30,000 to

50,000 volts. The coil proper consists of two "windings"—the primary, of but comparatively few turns of coarse wire, and the secondary, having a great number of turns of very fine wire. The current from the batteries is led through the primary coil first. This "induces" a current of an entirely different kind in the secondary winding, its voltage bearing the same ratio of increase to the battery current as the proportion between the number of turns on the secondary and primary windings, respectively. It is this secondary current which constitutes the "high-tension" circuit.

This high-tension current will not be induced in the secondary winding unless the primary current is constantly interrupted. It

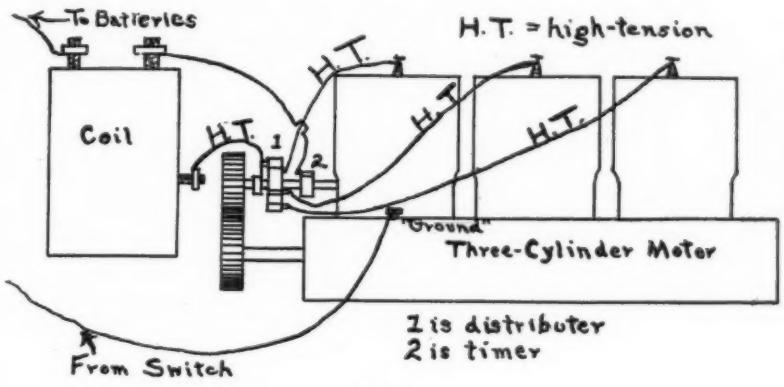


FIG. 3.

may be considered that these interruptions cause the current to "back up" on itself, and, when contact is again made, allow it to surge forward with increased force. The primary wire is wound around a bar of soft iron, which becomes magnetized when the current from the batteries is applied. Near one end of this bar is placed the armature, or vibrator, which serves to break the contact of the primary circuit when it is drawn forward by the magnetization of the iron core.

It is this harmless-looking vibrator which can be the cause of much trouble in the ignition system of a motor, for on its proper adjustment depends, not only the efficiency of the spark formed in the cylinder, but also the current consumption of the coil, and, consequently, the length of life of the batteries. Since this vibrator makes and breaks the electrical contact many thousand times a minute, and at each contact an intensely hot electric arc is formed, it will be seen that the contact points of this part must be made of a substance which is durable and at the same time will withstand excessive heat. Platinum, although very expensive, has been found to be the best metal for this purpose. But even this substance is not invulnerable to heat, and the imperfect running of a motor may more often be laid to worn or burned contact points than to weak batteries. When these points have become pitted from the heat of the electric arcs, the vibrator and thumb-screw containing the platinum should be removed and the surfaces smoothed with a piece of fine emery cloth, so that a bright, even finish is obtained.

No difficulty will be encountered thus far, but the trouble will probably begin when it comes to replacing the vibrator and thumb-screw and making the proper adjustment. The fraction of a turn in the wrong direction will make a great difference in the nature of the spark and in the battery consumption. The only sure way to obtain a perfect adjustment is to insert a delicate ammeter in the circuit and turn the thumb-screw until a strong spark is given, with an attendant consumption of less than half an ampere of current. One who has become familiar with a certain make of coil may be able to adjust properly the contacts by the sound of the "buzz" given forth, but this is not as sure as the former method.

Many of the better grades of coils are provided with an adjustment regulating the tension of the vibrator spring; but this, as a rule, rarely needs to be changed. When the vibrator is motionless, it should be kept about 1-32d of an inch away from the magnet, and the tension of the spring should be just sufficient to cause it to move back to its place immediately upon the breaking of the contact. In case the batteries have become weak, they may be made to give a slightly longer service by loosening the tension of this vibrator spring; but this should be reset to its normal strength when the new batteries are connected. The sound made by the coil should be a high-pitched buzz, but too loose an adjustment of the vibrator spring will cause this tone to be lowered. If undue sparking takes place at the contact points, the thumb-screw should be turned or the tension of the spring changed until this is eliminated.

If the current from the batteries is always sent through the coil in the same direction, it will be noticed that one platinum point will become pitted and seem to burn away, while the other will receive a corresponding deposit. This action will be reversed if the batteries are connected end for end and the current sent through the coil in the opposite direction. In case two sets of batteries are used, one alternating with the other, it would appear that less trouble with the platinum points will be had if the proper terminal of the coil is connected to the positive pole of one set and to the negative pole of the other. This is, in a measure, true; and it will be found that one set of batteries will partly counteract the work of the other, and the points will consequently remain smooth for a greater length of time. There is one objection to this method of connecting batteries, however. It is oftentimes advisable to connect the batteries together when either set, used separately, is too weak to run the motor, and in this manner the period of usefulness of two sets of batteries may be increased materially. When like poles of the two sets are connected to the same coil terminal, all the batteries may be used at once by fastening together the two bare ends of the battery wires near the switch. This may be done easily by running a wire from *A* to *B*, as shown by the dotted line in Fig. 1. When the sets are connected so that the current travels through the coil in opposite directions, how-

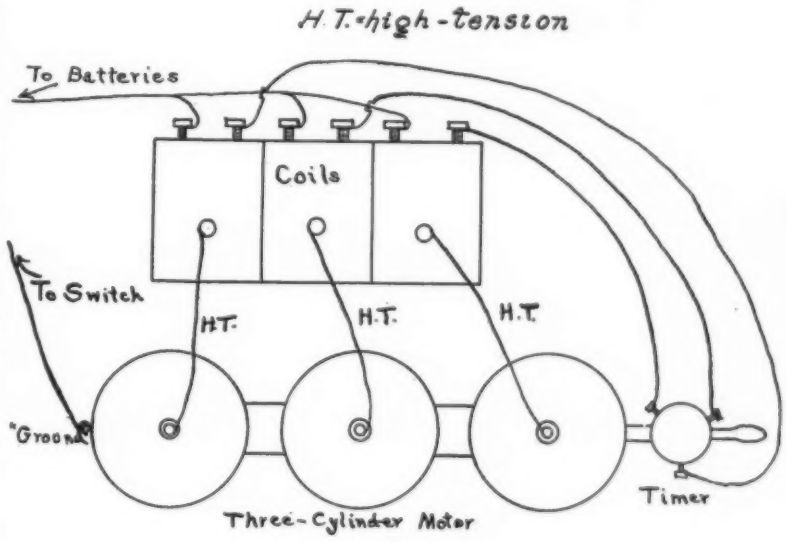
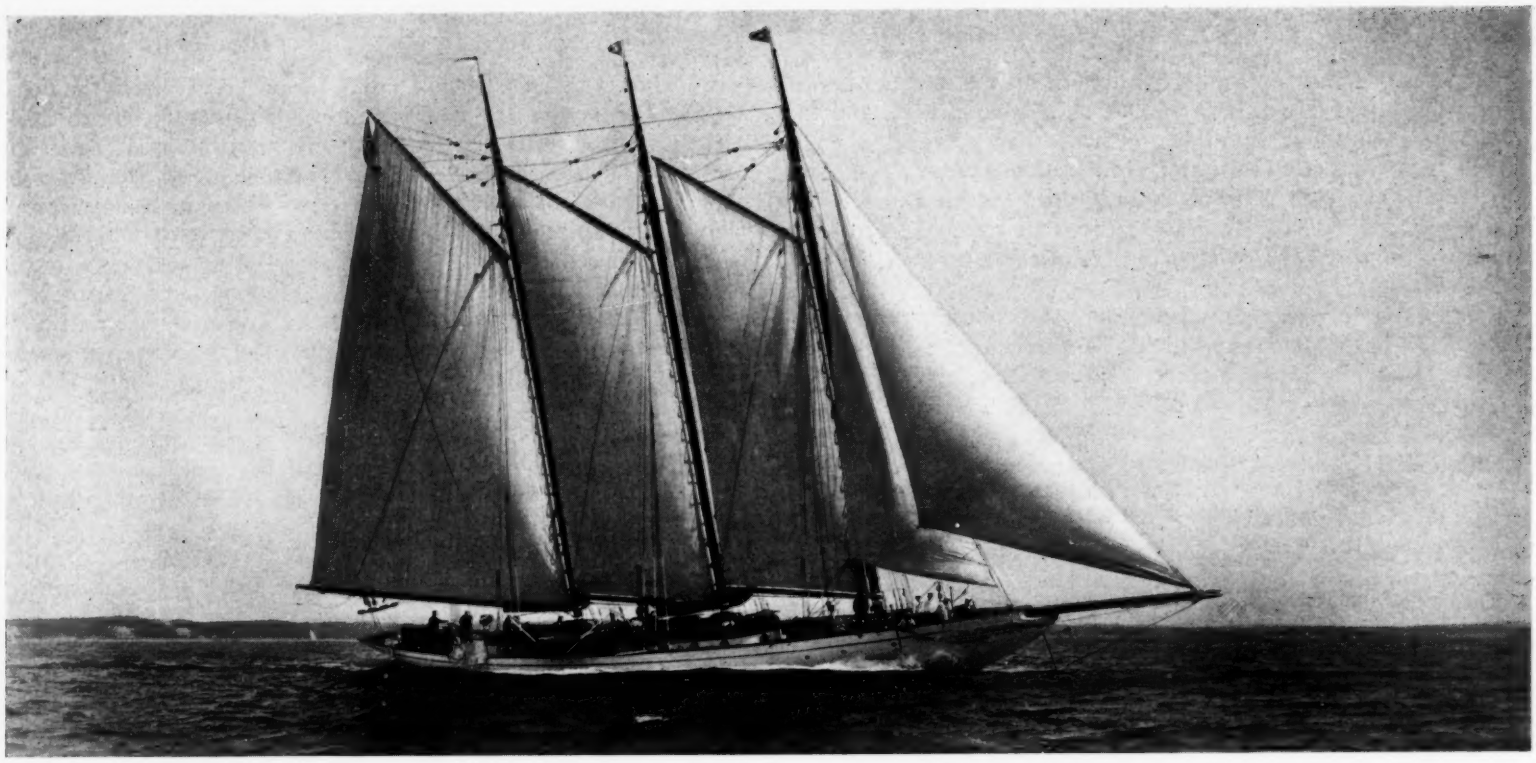


FIG. 4.

ever, all of the batteries cannot be used at the same time without rearranging the wiring of one whole set and connecting them end for end—or pole for pole, rather—so that they finally stand as shown in Fig. 1. While this is not a particularly strenuous operation, it requires time, and also considerable patience, if the batteries are located in an inaccessible place.

The average new "dry" cell should give readings of from 20 to 30 amperes and from one to one and one-half volts. When the batteries have weakened till they show but five or six amperes, their period of usefulness has passed; but as they will still main-

(Continued on page 64)



THE BRONZE 85-FOOT W. L. SCHOONER AZARA, BUILT IN 1904, AND EQUIPPED WITH A FOUR-CYCLE, FOUR-CYLINDER, 60-HP. MOTOR. SCHOONERS RIGGED WITH THESE POLE MASTS ARE OFTEN CALLED BY SEAFARING MEN "BALD-HEADED" SCHOONERS.

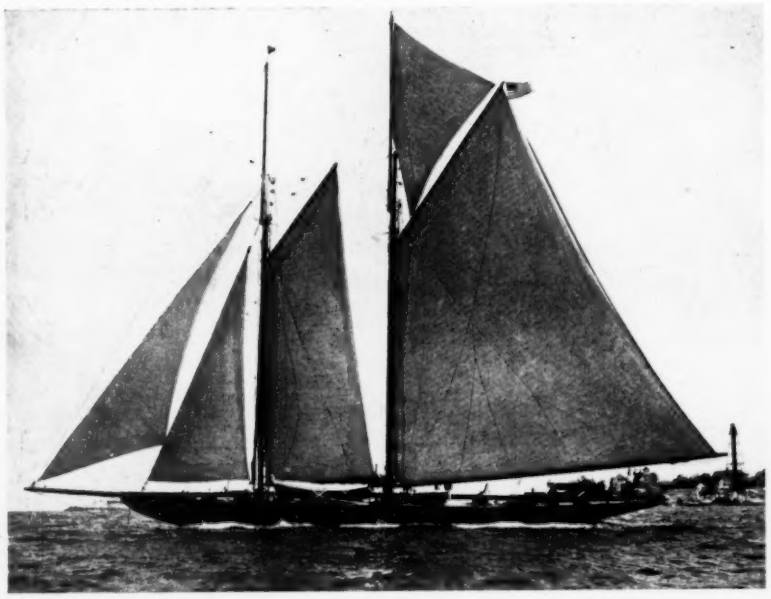
Gasolene in Deep-Sea Windjammers

By K. E. TREADWELL

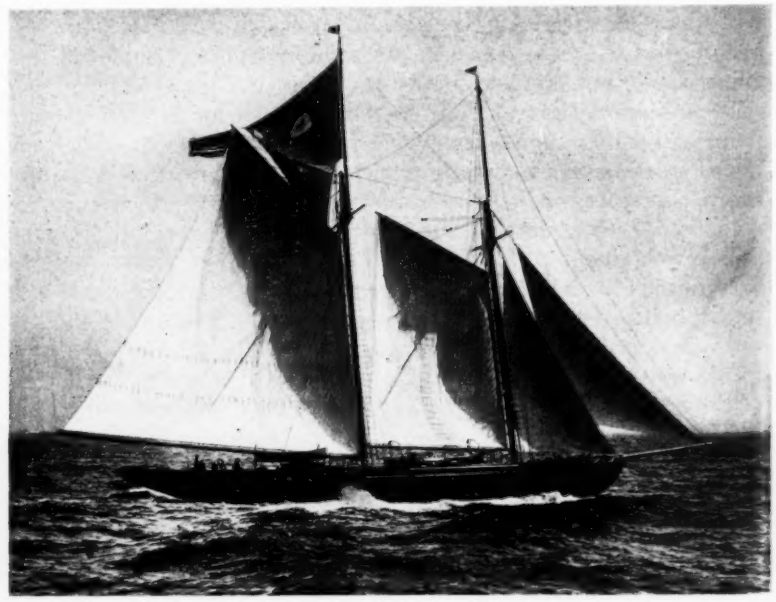
Photographs by Stebbins and Others

THE loss by fire of the auxiliary schooner yacht Ceylon, formerly Resolute, off the Isle of Wight, England, on the 10th of September last, has stirred up considerable anxiety on the other side of the ocean as to whether the use of gasolene for auxiliary power is, or is not, a safe proposition in deep-sea cruising craft. We quote the comment of the London "Field" on the subject:

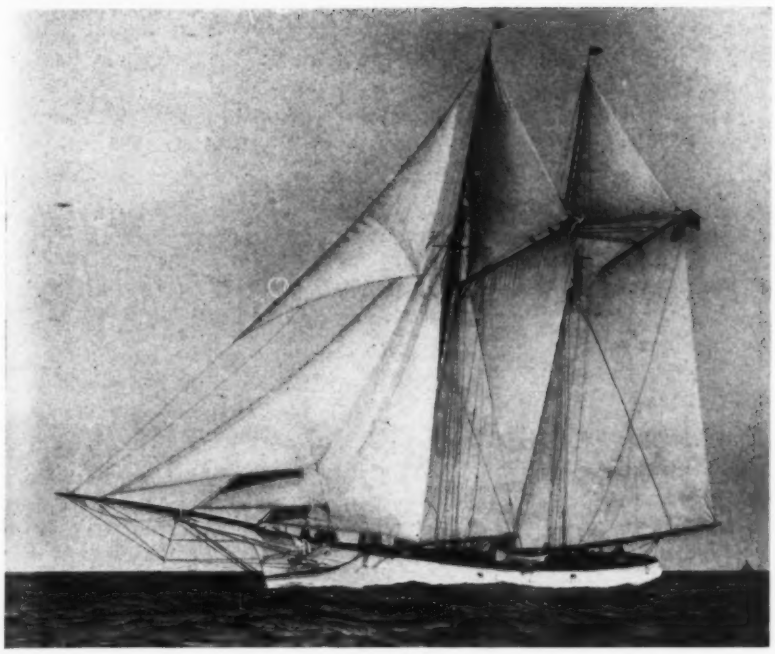
"As regards the use of petrol in small yachts, we are old-fashioned enough to say we would rather not be shipmates with it. Of course, we do not mean when pottering about harbors and along an inhabited coast; up and down Southampton Water and across to Cowes. Hereabout the petrol motor is safe and useful, if not to business men indispensable. But in a sailing yacht one should be able to go anywhere on the British coast where there is anchorage, and in any weather likely to be met with in the summer. Knocking about in rough weather at night, the lamp may upset



85-FOOT W. L. AUXILIARY SCHOONER CONSTANCE. A WOODEN BOAT, BUILT IN 1903 AND EQUIPPED WITH A 40-HP., FOUR-CYLINDER, FOUR-CYCLE GASOLENE ENGINE, WITH WHICH SHE MAKES OVER 6 KNOTS.



EDNADA, A WOODEN 86-FOOT W. L. AUXILIARY, LAUNCHED IN 1903. HER ENGINE IS A FOUR-CYCLE, TWO-CYLINDER, DEVELOPING 60 HP.



112-FOOT W. L. ALSACIENNE, BUILT IN 1881 AS A SAILING CRAFT, AND CONVERTED INTO AN AUXILIARY BY THE INSTALLATION OF A GASOLENE ENGINE, IN 1904.

when we have gone below to look at the chart or search the store cupboard; in cooking, and drying clothes something may catch fire in the forecastle. When one has been jumping into a head sea for a good many hours things below tumble about a bit, and in the cold and wet one is neither so handy nor methodical in practice when moving about in the dark cabin of a battened-down yacht as when cruising in the comfort of smooth water and sunshine. In these conditions, knowing the danger, it is questionable seamanship on the part of a yachtsman to cruise with a lot of highly inflammable motor fuel on board. There is, however, a wide future before the auxiliary motor yacht; she is now in her infancy. If the type gets a reputation for good service it will develop rapidly; if otherwise, its general acceptance will be long delayed. At the moment yacht owners are anxious to be convinced that motor fuel can be carried at sea in a sailing vessel without risk of fire."

Allowing for the natural pessimism of your Englishman in regard to anything with less than a century of use behind it, and also for the "Field's" tendency to weigh ponderously such matters, it would seem that our friends across the pond are unnecessarily scared.

As far as the Ceylon accident was concerned, it appears to have been caused by carelessness in the disposition and care of her lamps, the overturning of one into a berth starting the fire.

The well-known naval architect, Mr. Henry J. Gielow, was interviewed in regard to the situation as viewed by the "Field" article.

"I do not share the pessimistic views relative to gasolene as expressed by the 'Field,'" said Mr. Gielow, most emphatically.

"There is no danger in a plant using naphtha for fuel, or as an explosive mixture in an internal-combustion engine, if the plant is properly installed, whether aboard of a sea-going auxiliary or a small motor boat for operating along the coast.

"Where fires or explosions have occurred on board of yachts, such accidents have always been traced to faulty installation. If all plants of this kind were installed under the supervision of a thoroughly competent and experienced man there would be an end to gasolene explosions and fires on board of yachts. The trouble is that many yacht owners, through false ideas of economy, intrust such installations to irresponsible and incompetent men."

In fact, the real question is not the matter of safety, which has been settled, but the point at which gasolene ceases and steam commences to be the more economical and satisfactory power.

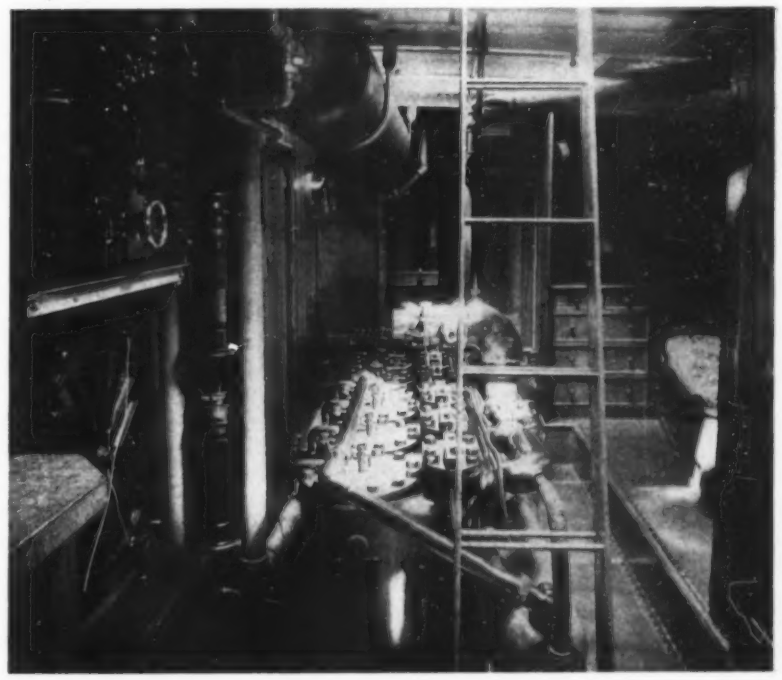
On the point of comparative economy Mr. Gielow goes on to say:

"It is a difficult matter to draw a hard-and-fast line showing where the internal-combustion engine stops and the steam engine commences, for if such a line could be correctly drawn to-day it would not be the same six months or a year hence. A few years ago it was thought that the internal-combustion engine of 100 horsepower was about the limit in internal-combustion engines. To-day internal-combustion engines of 600 horsepower are in use and run successfully in marine plants, while there are land engines working up to as high as 1,500 indicated horsepower.

"With gasolene as a fuel at current prices, the cost per horsepower is greater with the internal-combustion engine than in the steam engine where coal is used; but this does not necessarily mean that it is the most expensive in yachting, viewed from a commercial standpoint. If we were to take a yacht, say, 100 feet in length on load waterline, 16 feet beam, and equipped with, say, 300 horsepower machinery, the fuel account for the per hour run would be greater with the internal-combustion engine than with the triple-expansion steam engine plant; but this yacht would have very much larger living accommodations when equipped with a gasolene power plant than with a steam plant. If, on the other hand, one were to take a fixed number of cubic feet living space as a standard and build a yacht around it, the yacht having internal-combustion engines would be much smaller than if equipped with a steam plant, so that it would require less power to drive a smaller yacht at the same speed than a larger one, and in this way reduce the fuel account by reason of the lesser horsepower required to obtain the same speed. Furthermore, it must be borne in mind that the fuel account in the internal-combustion engine is running only so long as the machinery is running, whereas in the steam plant considerable coal is consumed in starting fires and getting up steam before the actual running commences; and after a run is completed there is a lot of coal left on the grates and goes to waste, in addition to the slow combustion due to banked fires over night. With everything carefully considered, there appears to be no material difference in the relative economy of the two under 1,000 horsepower."

Mr. George Owen, on being asked his opinion as to the comparative economy, said:

"The question is a very broad one, and I doubt if you could get two different authorities to agree as to the dividing line of economy and convenience of the gasolene motor as compared to the



ENGINE ROOM OF THE AUXILIARY SCHOONER HAIDA, SHOWING HER SIX-CYLINDER, 200-HP. GASOLENE ENGINE.

steam engine. Personally, I am rather inclined to favor the gasolene motor for open boats of any power, and the steam engine for decked-in boats, especially those where it is necessary to employ an engineer.

"As to economy purely, it would seem as if the gasolene motor in powers of 300 horsepower and under would make a better showing than the steam engine of the same respective unit power. In considering economy, I should take into account the fixed charges, such as first cost of engine, boiler, piping, etc., motor, piping, tanks, etc., and all installation connected therewith, and running expenses,—such as cost of fuel and lubricants, attendance, interest on investment, renewal and repairs, insurance, etc.

"As a matter of convenience, all things considered, I think there is no doubt that, for powers below 50 horsepower per unit, the gasolene motor is to be preferred, and the steam engine for all powers above."

"If the limit is to be placed by comparing economy of operation of the whole boat, we believe that 150 horsepower would be reasonable, based on our own experience and considering the average conditions," is the verdict of Irving Cox, of the firm of Cox & Stevens.

"If, however, the question of convenience is to come in as well as of economy, we would place the limit at 250 horsepower. Above this limit I consider, as a rule, that the use of the gasolene engine is an extravagance from the point of view of the operation of the vessel under general conditions, though it may be a convenience."

Morgan Barney's reply, when this question of comparative economy was put to him, was as follows:

"I assume that your inquiry refers to a comparison of steam and gasolene motors for yacht work only. At the present time gasolene engines of 100 horsepower that can be depended on for satisfactory performance in a suitably-designed vessel are available. By using two such motors driving twin screws it is now practicable to build a cruising yacht from 100 to 110 feet long and secure the same speed, cabin accommodations and cruising radius of a steam yacht of 135 feet with 350 horsepower. The first cost is considerably less, as well as the cost of maintenance, although the cost of gasolene used per mile compares unfavorably with the cost of coal for the larger vessel.

"I believe, however, that before long a slow-speed, heavy engine will be developed that will show sufficient economy to make its use practicable in vessels of larger size than those mentioned."

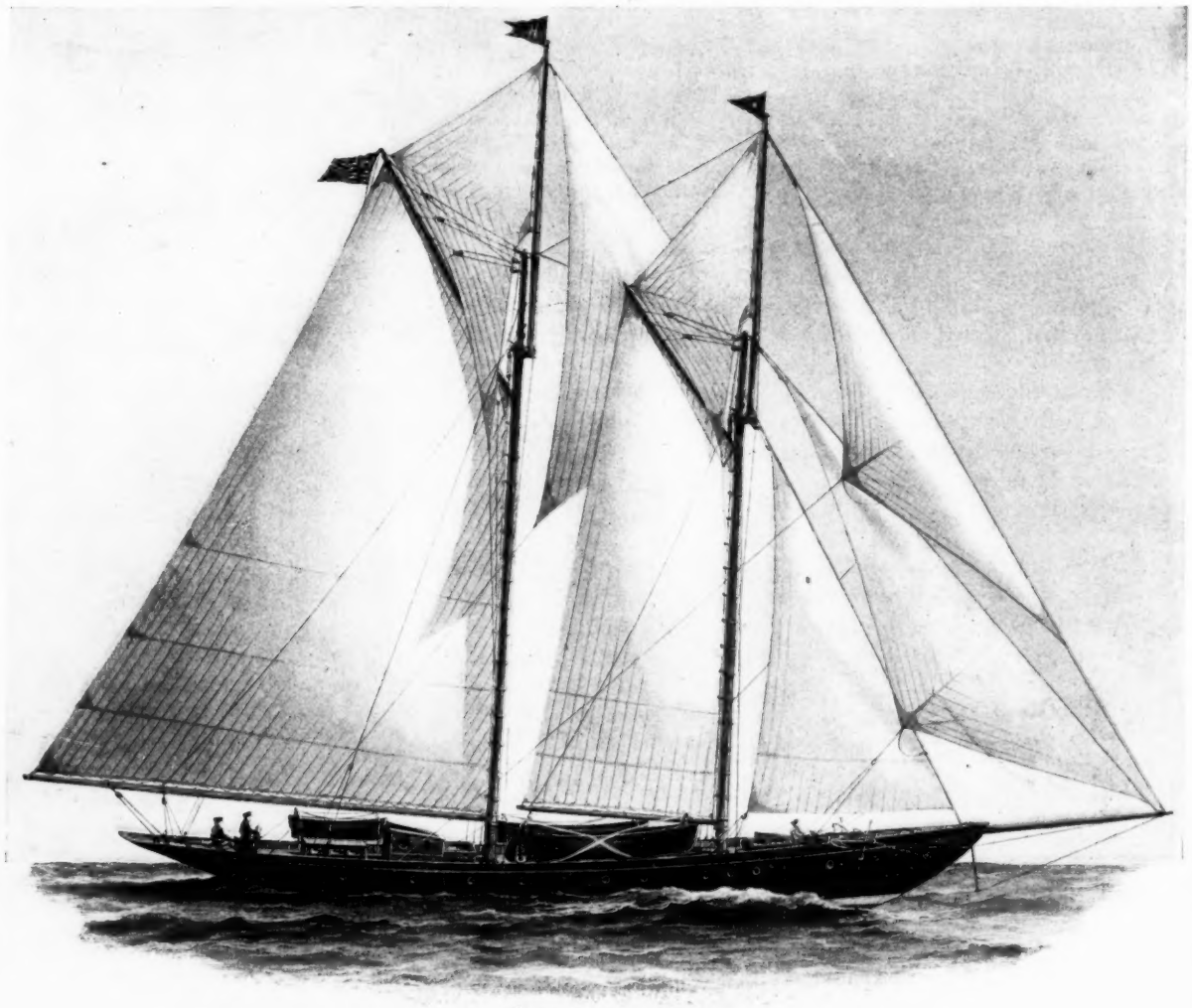
The use of gasolene as an auxiliary power in large sailing cruisers is nothing new on this side of the ocean, and there are many of our fine deep-water craft whose owners are now sure of at least 6 or 7 miles an hour in a calm.

There is, for instance, the 112-foot waterline, clipper-bowed schooner Alsacienne, once the Norseman, owned by Wm. T. Van Brunt, Esq., of New York City. She is one of the older type of craft, having been launched in 1881. In 1904 she was converted into an auxiliary by the installation of a four-cylinder gasolene engine. Just one year before the engine was installed in Alsacienne, E. F. Small designed the 85-foot waterline auxiliary schooner Constance for Mr. W. Amory Gardner, of Boston. She is one of the modern schooners, and her 40 horsepower, four-cylinder, four-cycle gasolene engine gives her, under ordinary conditions, a speed of about 6 knots. Under favorable circumstances she has made nearly 7. This is a pretty good performance, when the horsepower of the engine is compared with the dimensions of the hull.

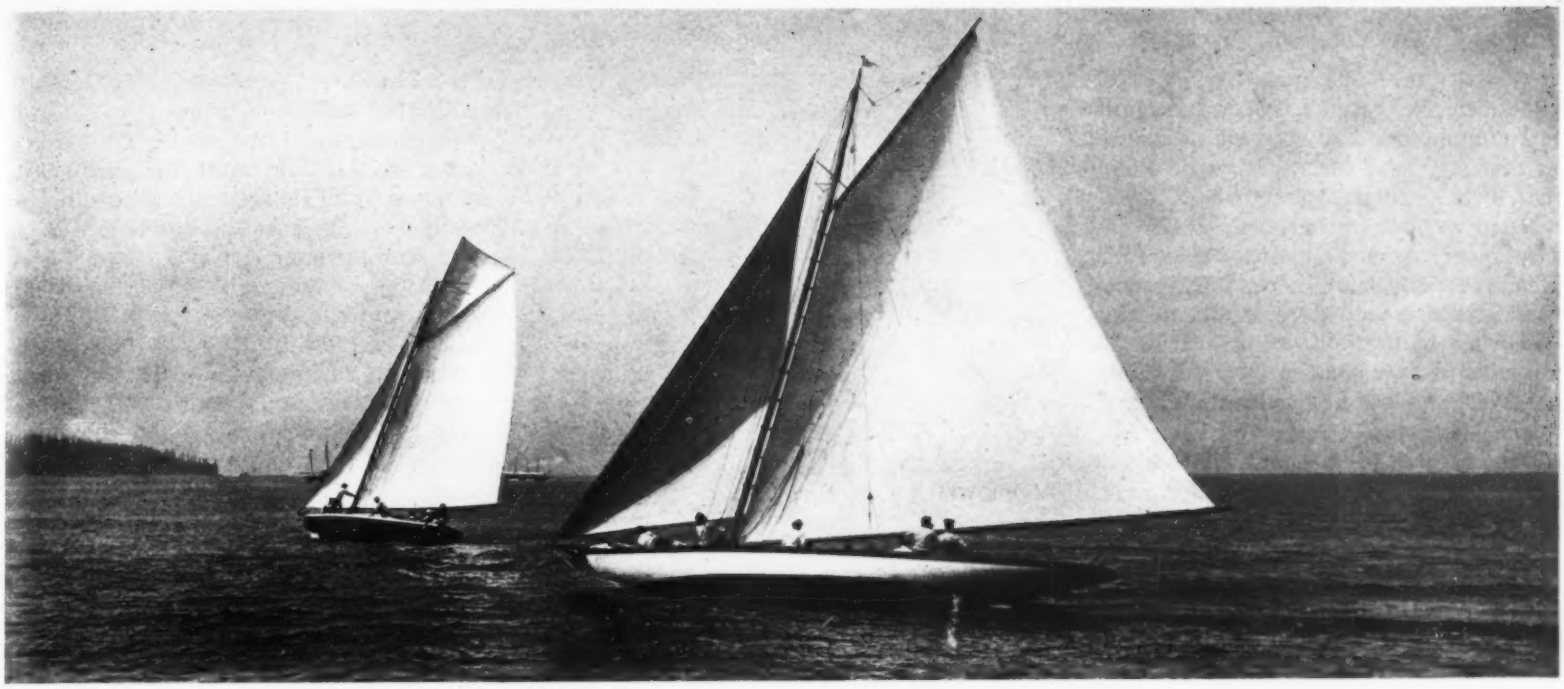
Another 85-foot waterline auxiliary is the three-masted schooner Azara, built in 1904. Designed by A. Cary Smith for C. W. Chapin, Esq., of New York, Azara, by those who know her, is considered a wonder. Her auxiliary power is a four-cycle, four-cylinder, 60 horsepower gasolene motor, which gives her a speed of something over 9 miles an hour.

The wooden 86-footer Ednada, owned by Geo. C. Thomas, Esq., of Philadelphia, and launched in 1903, is an extremely good example of an auxiliary schooner built to meet certain requirements and successfully filling them.

(Continued on page 60)



75-FOOT W. L. COMPOSITE AUXILIARY CRUISER HAIDA, LAUNCHED IN 1908. EQUIPPED WITH A 200-HP. GASOLENE MOTOR SHE MAKES 9 MILES PER HOUR, AND CAN CRUISE FOR 1,000 MILES, UNDER POWER ALONE, WITH ONE FILLING OF FUEL TANK.



SPIRIT LEADING ALEXANDRA AT THE START OF THE FIRST RACE.

The Northwestern International Regatta

By FRANK M. FOULSER

Photographs by the Author

LIKE a happy family seated around the festive board, the cities of Victoria and Vancouver, B. C., and Bellingham, Everett and Seattle, in Washington, cluster around the northern arm of Puget Sound. Less than seven-score miles separate the most divergent of these cities, yet a thousand-ton steamer could visit them all by devious winding channels covering hundreds of miles, and find anchorage in countless harbors among islands no whit less beautiful than those of the St. Lawrence, or the far-famed Lakes. And the best part of it is that this may be done without discomfort, if not with the greatest enjoyment, for 365 days out of every year.

Here are conditions which are paralleled nowhere else in the wide world; conditions which lend to sailing or motor boating a zest which only those who have experienced it can fully understand; conditions which are bound eventually to individualize this body of water in the eyes of all and make it the Mecca of every yacht owner who can raise the price of a ticket or bring his craft "round the Horn."

To these conditions are due the marvellous growth of the Northwestern International Yacht Racing Association, under the auspices of one of whose members, the Royal Vancouver Yacht Club, this year's successful regatta was held. The Englishmen have been at the yachting game longer than we have, and the high plane on which the yachtsmen of Vancouver and Victoria conduct their contests has set a valuable example to the hustling business men of the young American towns, who are just commencing to learn the fascinating possibilities of Puget Sound.

RIVAL, THE EVERETT YACHT CLUB'S CONTENDER FOR THE HONOR OF DEFENDING THE CUP.

Barely two months previous to the date fixed for the trial races to select a defender for the Alexandra Cup—which Spirit, of the Seattle Yacht Club, won the previous year from Alexandra, of the Royal Vancouver Yacht Club—the Everett Yacht Club decided to build and enter a boat. It was, under the circumstances, a colossal undertaking, as the club numbered only about fifty members, and the town had never been enthusiastic over the subject of yacht racing.

Messrs. Lee & Brinton, of Seattle, were selected as designers, and although Lee had designed some fast boats in the East, they had done nothing in the West outside of power boats. They were, moreover, handicapped by certain scantling restrictions which had been adopted since the building of Spirit. Rival, as the Everett boat was named, came from the shop about six weeks after her keel was laid, looking more like one of the Class Q boats developed under the Universal Rule than any other type. She was 46 feet over all and drew about 7 feet. Her sails contained 1,400 feet of canvas, and, to offset this huge spread, 8,000 pounds of lead was moulded in her keel.

To add to her difficulties, a crew had to be organized and drilled from totally inexperienced material; but with an en-

ergy that never flagged, Commodore Goldfinch, of the club, got a bunch of recruits together and whipped them into surprisingly good form. It would seem that such herculean efforts should have escaped without further mishap; but on the day preceding that set for the trials Rival carried away her solid spruce mast, which snapped under the strain when one of the hollow spreaders collapsed. She was taken to a shipyard, however, and within twenty-four hours a new stick was in place and every bit of rigging was back where it belonged.

To the disappointment of everyone concerned, Rival failed to make as good a showing as had been hoped for, although at times her performance was surprisingly brilliant. The three trial races, which were held in Seattle over a triangular course of 12 miles, were won decisively by Spirit.

At the Vancouver regatta, later in the season, Rival came into her own, and, in a very light air, dished up one of the biggest surprises of the regatta by leaving the entire fleet behind and walking away with the most coveted prize of the week, the magnificent Key City trophy, offered for the fastest time made over the 12-mile international course. No victory could have been more popular, and when the gray-haired skipper received the big urn-shaped cup, the very rafters of the new club-house of the Royal Vancouver Yacht Club rang to the echo. Immediately upon the Rival's return to Everett an ovation was given her crew; and the club, augmented to nearly two hundred members, voted a small, one-design class for the development of international sailing timber.

With the Rival disposed of, Alexandra and Spirit met for the second time to struggle for the possession of the beautiful Dunsmuir trophy. This time the Canadian was armed for the contest of her life. In the hands of Evans B. Deane—a man whose love for a beautiful boat is paralleled only by that matchless adoration which an Arab is said to have for his horse—the Fife product was certain of every advantage which human skill and years of sailing experience could devise. Practically deserting his business, Deane spent every waking hour in developing boat and crew. Deane is a man of mature years and judgment. He has raced in many waters. His knowledge of local conditions is encyclopædic. With the memory of Alexandra's defeat last year by Ted Geary, the Seattle schoolboy, in two of the hardest-fought races of yachting history to warn him, he took care not to underrate his opponent's skill or the speed of the rival craft. It was the pick of the Northwest that made for the starting line on the morning of July 1.

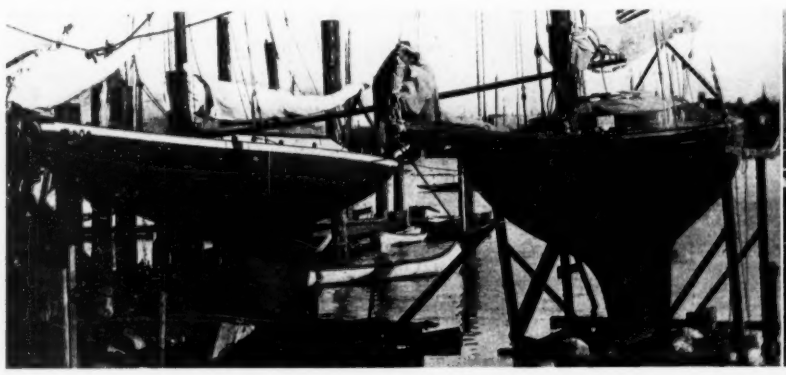
LAVITA. THOUGH AN OLD-TIMER, SHE SURPRISED THE SHARPS BY WINNING IN HER CLASS OVER MORE MODERN BOATS.

Geary, a year older and a year wiser, with the advantage of a year's association with the crack designers of the East, has lost little of the boyish enthusiasm which made his big victory of last year seem so incongruous. If anything, he is more crazy about boats and racing than ever. Although unavoidable exigencies permitted scarcely a week for tuning his boat and drilling a crew for the trial races, Geary was ready for the gun, keen-eyed, alert and master of the situation.

The details of the race, interesting as they are, cannot be given fully here. The Alexandra won, fairly, squarely and grandly. Yet, in the minds of many, the question of supremacy still remains unsettled, and never did a defeat leave the vanquished with so untarnished a reputation as the winning of the second annual competition for the Alexandra Cup left Ted Geary. "Jimmy" Deane has demonstrated his right to the title of a master helmsman, Fife has re-established his claims to the sobriquet of the Wizard of Fairlie, and the contest next year promises to be one of the warmest arguments ever seen in yachting. For this year, the winning of two races out of three has cost thousands of spectators enough nerve-wear to last a twelvemonth.

Local conditions in Vancouver are not all that might be desired for pulling off a big race. The winds are very fickle and the currents strong. English Bay is so shaped that it is impossible to get a 4-mile triangle within its margins, so the hydrographer was obliged to lay out a triangle, three by four by five, with the beat on the long leg.

From a spectacular standpoint, it must be admitted that the first day's race was a failure. Geary, with his quicker-working boat and a crew that handled canvas as if they had been racing all their lives instead of its being, as in some instances, their first racing experience, got the better of the start, and, in a freshening breeze, commenced eating into the wind. Nothing could be seen of the crew of Alexandra, with the exception of the skipper—a tense, solitary figure in the cockpit. The faces of the Canadian sympathizers lengthened in comic ratio to the distance of Spirit's lead, when suddenly Deane, standing well inshore, caught a better



THE UNDERBODIES OF SPIRIT AND RIVAL. SPIRIT TO THE LEFT.

SOYA, WINNER OF SPECIAL CLASS LONG-DISTANCE RACE, SEATTLE TO VANCOUVER.

slant, and the hard-earned advantage slipped out of Geary's hand. It was some minutes before the uninitiated saw what had happened, but as soon as Deane crossed his opponent's bow the international shift of expression was funny to behold. Right there the race was lost. The Canadian skipper, keeping well inshore, took masterful advantage of every helping eddy, and rounded the first buoy by a liberal margin, which was increased as he ran down the second leg with spinnaker and balloon set, while Geary headed painfully into the incoming current from the Frazier River, which empties just below English Bay. A falling breeze increased the advantage of the head boat, and over half an hour elapsed before the American representative idled by the finishing flag.

The second race told a different story. With a day between, devoted to class racing, time was afforded to haul out and go over the bottoms of the two cracks. Friday dawned cold and rainy, with an easterly breeze. The course was reversed, and the boats sent off on a broad reach. Again Geary led, but after a portion of the leg had been traversed he was blanketed and passed. Both boats held off their course to take advantage of their spinnakers, and not until the leg was well advanced did they slice in across the tide rips which mark the northerly boundary of English Bay. Geary, hanging right on the quarter of his opponent, felt the advantage of the little topsail which his smaller sail area permits him to carry, and only 43 seconds intervened when the first buoy was passed. This lead was stretched into something over a minute on the reach to the outside mark; but when that was rounded the American supporters felt that now, if ever, was the golden opportunity. Remembering his lesson of the day before, Geary kept close inshore along the edge of the dreaded Spanish Bank, out of the way of the current. But in his zeal to take advantage of the favoring conditions, he kept in too close and went aground. A groan went up from the American sympathizers; but the fickle goddess, evidently ashamed, kept him on the bank less than a minute, and in the next breath sent a favoring slant from the westward that landed him ahead of his cunning rival. The skippers reversed their policies of the day before, the American keeping inshore, the Canadian out in the center of the bay. Alexandra was pointing higher, but Spirit was footing faster. Still maintaining the weather position, Geary judged his distance to such a nicety that, coming about on the starboard tack, he weathered his opponent within 300 yards of the finish line and forced him about. Deane attempted to wriggle out of the hole by short hitches, but was checkmated at every turn by the quicker, smaller boat. His judgment on this particular situation is open to question; but it was a difficult problem, and required speedy action either way. Had he ducked astern and made directly for the line, the finish would have undoubtedly been closer. As it was, completely blanketed, Alexandra lost headway and crossed over a minute behind Spirit.

Naturally, this turn in affairs intensified public interest, and a record-breaking crowd was on hand to see the final struggle.

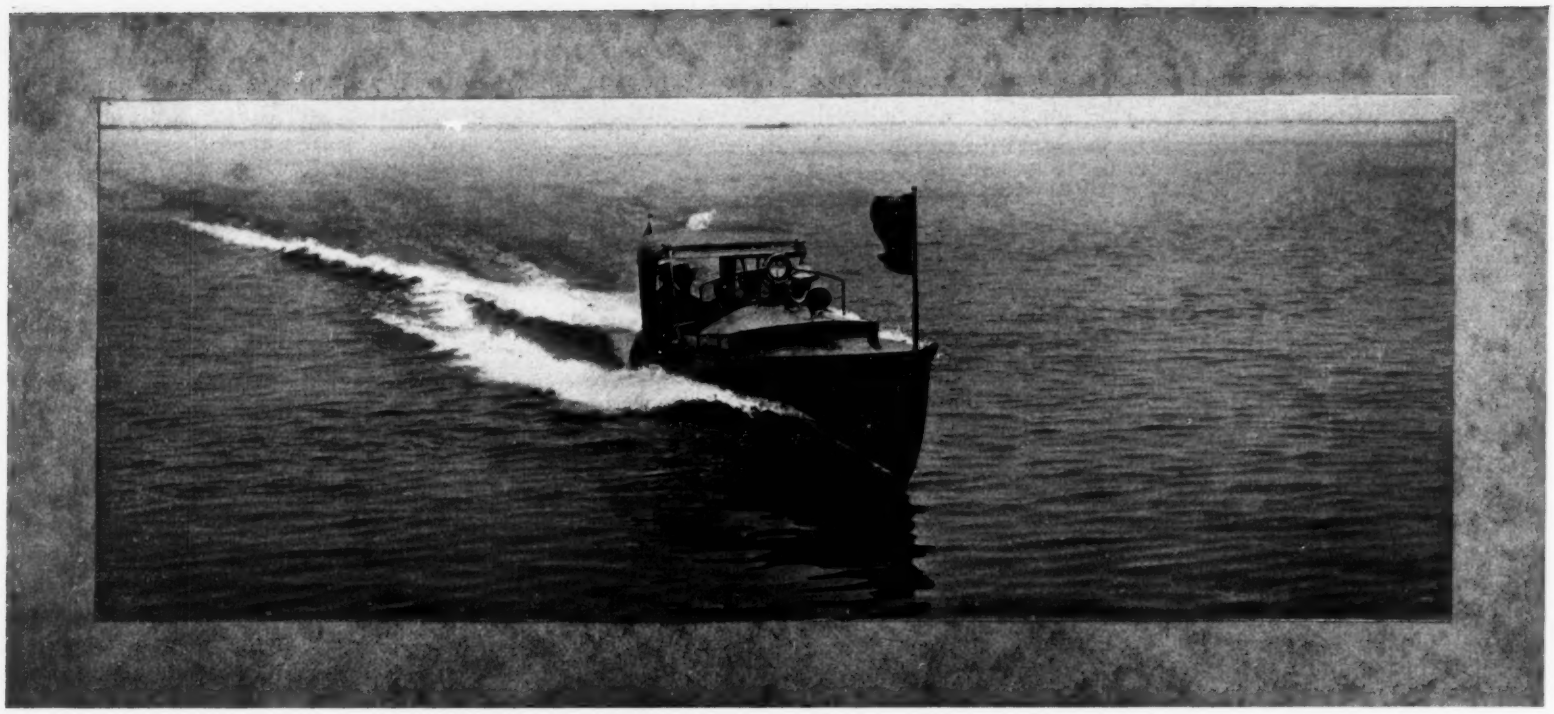
SPIRIT. THOUGH SHE WON THE ALEXANDRA CUP IN 1907, SHE WAS DEFEATED BY ALEXANDRA IN 1908.

Again the boats were started running. This time Alexandra crossed first, breaking out spinnaker and balloon with clock-like precision. Right on her weather, Spirit waited the settlement of her opponent's canvas before setting her own. Geary was unable to blanket the other boat, in spite of his windward position, so ducked astern and headed straight for the first buoy. Deane, seeking the helpful tide, held up more, and, a few minutes later, plunged into the rips. A very light air prevailed, and the beautiful yacht staggered through the spume with the water sweeping her decks and her sails slatting. Before long Spirit was in, too, and the spectators were treated to the unusual sight of two racing yachts drifting along at the rate of 3 miles an hour, with sails that threatened each moment to scoop up barrelfuls of the plunging tide. Deane got nearly four minutes' start in this bruising match and headed for the outer buoy, carrying a little breeze that increased his lead. Suddenly the wind dropped altogether, and when it came up again, about half an hour later, its direction changed the leg into a beat. Fortune stayed with the Canadian, giving his boat the windward berth in the new shift, with a lead that looked almost impossible to overcome. Geary attempted to draw his opponent into a tack-splitting contest, and was partially successful. His gains in this were suddenly supplemented by another shift, which cut down Alexandra's lead to the point where the battle for the mark became a most exciting struggle. But another shift aided Alexandra, and from that point she was never headed, although the pulses of the spectators were set a-tingle by the unexpected manner in which Spirit held on to her foe in the run for home. Three minutes and forty seconds separated the rivals at the finish, and the crowd went wild.

Although overshadowed by the bigger event, the two days of class racing which marked the regatta were full of interesting brushes and many surprises. The performance of Rival has already been spoken of. Another unexpected tea party took place when the sloop Lavita, veteran of many past struggles and long since dedicated to the tailend of the fleet, woke up beneath the magic touch of Ted Geary and waltzed down the line like a girl at her first ball.

In connection with this regatta the first long-distance power-boat race of the Pacific Coast was held—a run of 182 miles from Seattle to Vancouver. This was the first event of the week, and created a great deal of interest. The course included a run around Vashon Island, thence across the Straits of Juan de Fuca, through Active Pass and across the Gulf of Georgia to English Bay, and was for a cup offered by the Royal Vancouver Yacht Club. The rules governing were the American Power Boat rules for 1905. After an interesting run, the winners turned up in Traveler, of Seattle, in the Handicap class, and Soya in the Special class.

As a result of the need for an organization among power-boat men, the Northwestern International Power-Boat Association has been started to look after the interests of power-boating in this vicinity, and motor events of all kinds will now be fostered.



MARCEL WAVE II. COMFORT AND PLEASURE AT 22½ MILES AN HOUR. A FEW YEARS AGO SHE WOULD HAVE BEEN ALL ENGINE.

The Month in Yachting

IN an effort to have a representative gathering of American yachts in the races of the *Sonderklasse* off Marblehead next September, the Eastern Yacht Club committee, which has charge of the plans for meeting the little German sloops, are proceeding with commendable activity. Letters have been sent to important yachting centers throughout the country urging clubs to take such steps as will enable them to be represented in the trial races to select three American defenders of our national yachting laurels. There is, indeed, no reason, so far as I can see, why all sections of the country should not be represented, at least in the trial races, next season. Boats may be built in the East at a cost not exceeding $1,600, and the entire cost of upkeep would not exceed $2,400 at the outside. The Seattle Yacht Club has received a most urgent invitation to enter the contests, and reports are that the project is being seriously considered. There is no reason why the Seattle men should not come to the Atlantic seaboard. Washington has already been represented in *Sonderklasse* races, not only in the trial races for the defense of the cup for which President Roosevelt stood sponsor in 1906, but in the races against the German boats in Germany in 1907. This sloop Spokane was owned by Vice-Commodore F. Lewis Clark, of the Eastern Yacht Club, Marblehead, who, although a resident of Spokane, Wash., is a prominent figure each summer in racing in New England. With boats representing Puget Sound, Lake Michigan, Massachusetts Bay, the Sound, San Francisco Bay, the inland lakes of the Northwest, and Southern waters, a remarkable *esprit de corps* involving the yachtsmen of the country would be the result; and no one, of course, will attempt to gainsay the statement that this would be an excellent thing. In this connection I am happy to say that the Hampton Roads Yacht Club, of Norfolk, Va., is seriously contemplating the project of entering a boat in these trial races.

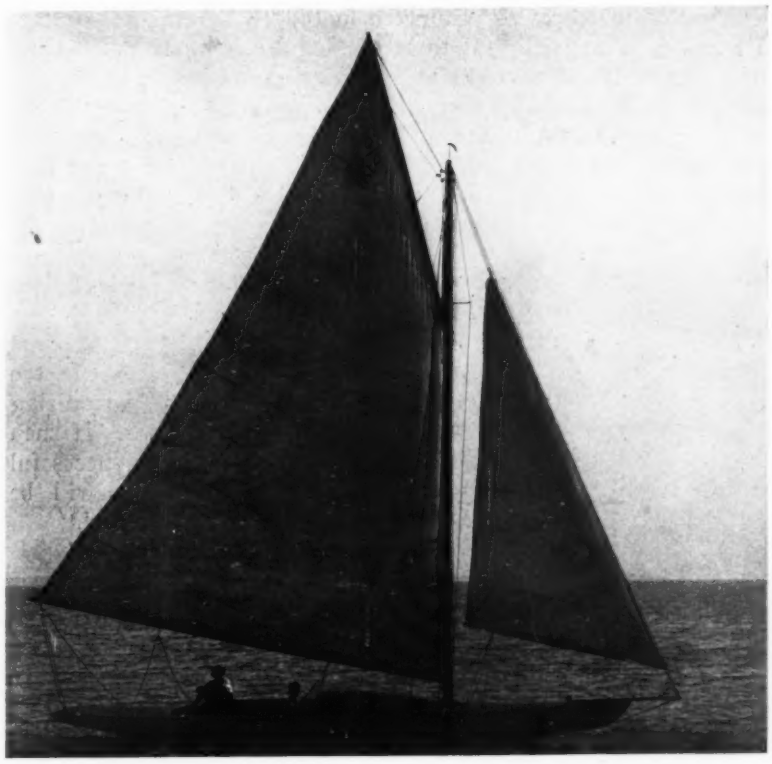
I wonder if the New York Yacht Club will find courage, in the face of last season's showing, to make an attempt to further promote the handicap class, which was instituted with so much *eclat*—on paper—last year. That the innovation in club racing proved a success not even its most enthusiastic adherent, which I take to be Prof. Charles Lane Poor, would be inclined to admit. And yet the project was well conceived. It was designed to provide racing for those who cannot afford to build a new boat every year and thus keep pace with the class to which they happen to belong. A fair and comprehensive scale of handicaps was devised, and when the season's regattas began everything was in readiness for the new class—everything, at least, but the boats. If appearances count for anything, the fact that New York Yacht Club classes have not filled in recent seasons was due less to the inability of members to keep up with new boats than to a general disinclination for racing at all. The only consistent entrants in this class, indeed, were the sloops Mimosa II and Dorwina.

The more you look at it, in fact, the more you fall in with the ideas of some of the more energetic racing members of the New York Yacht Club that racing interest among the members has gone to seed. Now I do not say this merely in the way of handing the organization a gratuitous slap in the face. No one would like to see well-filled regattas of this club more than I. But its regattas are not well filled; compared with meets of other clubs, smaller and far less wealthy, the contests of the New York Club, aside from those which mark the annual cruise, are puerile. The trouble is—and the fact might just as well be loudly announced as whispered about among the racing members—the club is filling up with steam yacht men, and they naturally do not care whether the racing of sail-driven craft amounts to anything or not so long as they have a place to dine, to receive their mail, and stations where they and their guests may land without the necessity of making fast to a public pier.

Last summer I saw one of the most ardent and skillful racing men the club ever produced watching the King's Cup race off Newport, not from the deck of a yacht, but from the back of a horse. C. Oliver Iselin certainly looked out of place on shore while the burgee of his club was being borne by swift yachts engaged in a great race; but he was not the only member of the club associated with past racing events who was on land that day. What is needed is a general awakening of interest in the New York Yacht Club, and there is just one thing that will surely bring such awakening about: a race for the America's Cup.

Last season the Regatta Committee of the club was under constant strain in trying to collect a decent number of entrants for the cruise. They had to appeal to owners in some cases on per-

sonal grounds, and the fact that the eastward jaunt was respectable at all was alone due to the efforts of this committee. Such conditions make the yachting enthusiast sick. The club had a chance to buy the property of a finely-situated Sound organization some time ago; but, of course, the opportunity was allowed to slip



WHERE EVERYTHING GIVES WAY TO SPEED. THE FINE, DRAWN-OUT ENDS, ABSENCE OF SHEER AND LARGE SAIL AREA MARK THE RACEABOUT.

by. What's the need of having a house near the water when there are plenty of siphons in the bar? The New York Yacht Club wants to wake up or the public will begin to forget that it was ever regarded as a national institution of racing.

A man who has done considerable cruising in a small sailboat called at this office recently to protest against what he seemed to think was a sentiment on the part of this magazine to regard the small windjammer only in its capacity as a racer. To prove that it has other and valuable functions, he told me how he and his friend had cruised all through his summer vacation crowded "comfortably" in the cabin of his 16-foot catboat. Well, I have no doubt of that. You can, if you cling to old-fashioned ideas, have a whole lot of fun in a catboat of from 15 to 25 feet waterline; but for downright fun and comfort, to say nothing of safety, blow high or blow low, give me the knockabout. You can cruise in a knockabout, or you can race, and she will be good at either. Take one of these sloops, say, up to 28 feet, carrying one headsail, and, of course, no topsail, and you have as handy a craft for knocking about bay, sound or harbor as you could wish. And if you enjoy the blue skies, the sunlit waters, pleasant harbors, and all the other concomitants of cruising without feeling the necessity for the thrill of racing, a knockabout is just the thing. It needs as little attention as a self-winding clock. You do not have to worry about the underbody. What if there are a few barnacles on it? What if it does not glide as swiftly through the water as the bronze hull of your neighbor's mug-hunter? Little you care so that it takes you from port to port in fairly decent time. You can carry heavier canvas than your friend who races, and heavier spars. The result is less danger of strained decks or broken sticks. In a sloop of from 25 to 30 feet there is space for a comfortable cabin, as well as quarters for one or more professional sailors, if you are not enough of a skipper to be without them. On a 21-foot knockabout, in fact, you can have a fair-sized cabin with transom berths, while on a 30-footer you can have a regular stateroom; in other words, you can cruise in bloated luxury on a knockabout of 30 feet waterline.

There is a great deal of misapprehension as to the difference between a knockabout and its relative, the raceabout, and questions as to the origin and salient points of each are not rare in this office. Knockabouts came first. They were handy little boats with no bowsprits, the forestay running through an eyebolt on the stem. But later, as the sporting blood of men sailing boats of this type became heated, they began stealing advantages over their racing rivals in knockabout classes by adding a short bowsprit, leaving out cabins and increasing the sail area. In one race, some time ago, a regatta committee member, seeing one of these extreme knockabouts coming up to the line, exclaimed:

"Why, she is not a knockabout; she is a raceabout!"

Thus the name, which has always stuck, and which resulted in a new class. Showing how the raceabouts have advanced at the present time, it may be pointed out that, whereas a 21-foot knockabout will be about 28 feet over all and sport less than 500 square feet of canvas, a raceabout of the same length will be 33 feet or more over all, 1 to 1½ feet less beam, and will carry 600 square feet of canvas. In construction a cup-winning raceabout of the present time is the merest shell.

The Automobile Club of America, I see, has divined the situation, borne of its entrance into motor boat affairs, and has announced its position with a degree of tact which, if further observed, will result to the best advantage of the power boat game. The club announces that it has no intention of attempting to assume charge of national motor-boat racing in this country. Representatives of the motor-boat division of the automobile organization will attend the convention of delegates from motor boat clubs throughout the country, which will convene at the National Motor Boat Show in New York in February, and will do all in their power to assist in the organization of a national body. The motor boat division will not attempt to maintain jurisdiction over

NYRIAD. IN THE OLD 21-FOOT KNOCKABOUTS A MAN COULD CRUISE AS COMFORTABLY AS IN MANY A LARGER CRAFT.

racing in the United States; but inasmuch as the Automobile Association has been appointed to represent the International Association, composed of the leading automobile and motor boat clubs in Europe, it will strive faithfully to enforce in this country—whenever international races are held—the rules of the International Association formulated annually at the International Con-

gress. No amount of tact, of course, will enable the motor-boat men of the Automobile Club to sweeten this dose, and the Motor Boat Club of America will find difficulty in swallowing it. Under the rules recently adopted by the International Association, all international racing, except such as is sanctioned by representatives of this body, is prohibited. The Motor Boat Club of America holds the Harmsworth Cup, and should it refuse to race under the jurisdiction of the international body, the outlook in the near future for another contest for the trophy won by Dixie I and Dixie II would not be especially good, since the large English motor-boat clubs are included in the International Association.

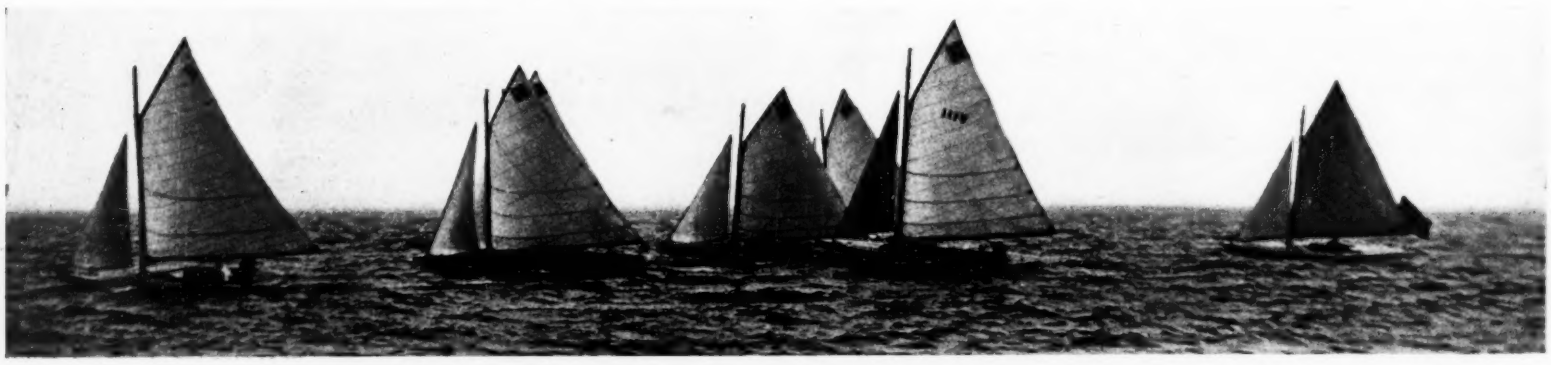
Speaking of racing motor boats causes me to reflect, in passing, on the change that has taken place in the utility of speed craft in the last year or two. It was but a short time ago—when a speed of 20 miles and upwards was the limit—that to get such a speed everything was sacrificed to the engine. There were no accommodations; the motors threw oil over the entire cockpit, while the boats were flimsy affairs, leaked when pushed and were always wet. Now-a-days a speed of 22 miles may be had in pleasure craft with large cockpits, easy chairs and canopy tops, while the boats are well built, will stand plenty of banging around and are not racked to pieces by the motors. It is a long step forward, and I confidently look for still further development along this line. Unless a speed boat can justify itself in the pleasure the owner can get out of it, there will be but few built.

DORWINA, THE MOST CONSISTENT PERFORMER IN THE HANDICAP CLASS. OUT OF THIRTEEN STARTS SHE TOOK SEVEN FIRSTS AND ONE SECOND.

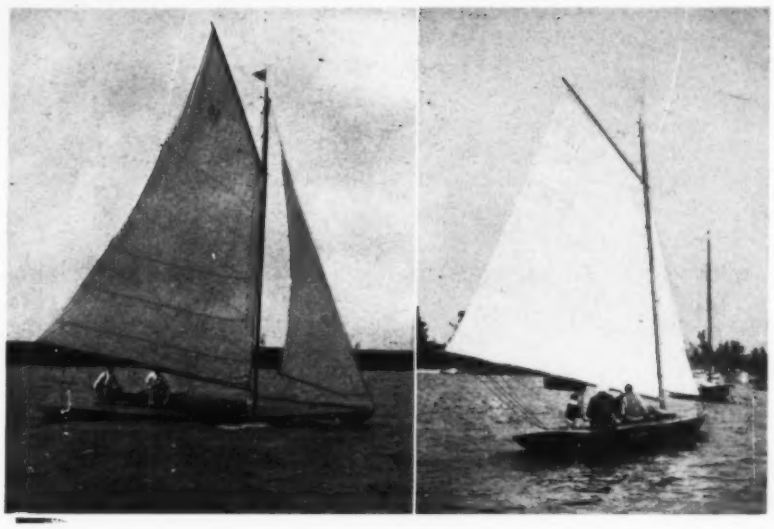
Arthur Curtiss James will make a good commodore of the New York Yacht Club, his name having been presented for that office by the club nominating committee, of which J. P. Morgan is chairman. He owns the big auxiliary yacht Aloha, a familiar vessel in foreign waters and on the port-to-port runs of the New York Yacht Club. Recently he purchased the Addicks property in Newport and will join the summer colony of that resort. He is progressive, popular and resourceful, and under his administration the club should shake off some of the conservatism which has not been especially conducive to the racing interests of the club for some years back. Not that I intend casting reflection upon the retiring commodore, Cornelius Vanderbilt. He has in every way observed the dignity of the position, and has worked indefatigably for the best interests of the club. But it is doing him no injustice to say that he has been ultra-conservative; and what is wanted in the club at the present time is a man who is willing to take a chance now and then.

I am glad to hear that the Rochester Yacht Club is already considering plans for the defense of the Canada's Cup, the America's Cup of the Great Lakes. That the Ontario yachtsmen will leave nothing undone to keep the trophy on the American side of the lake may be gathered from the way in which the defense of the cup was conducted in 1907. As a matter of fact I am somewhat surprised that the Royal Canadian Yacht Club of Toronto should have challenged, naming a 27-foot sloop. The success of Herreshoff's Seneca against the Payne sloop Adele, which in turn had defeated sloops designed by Fife and Mylne in the races to select the challenger, argued quite convincingly that the Bristol wizard "had it on" any designer which could be dug up on the other side of the Atlantic. It may be, though, that some Canadian expert has come to the fore with tentative designs which look good on paper, at least. It will be remembered that after the race of last year the Canadians were talking of patronizing home talent in the next races. If such proves to be the case, and a successful boat is turned out, no one will be happier than a whole lot of yachtsmen on this side of the border, who feel that the dominance of one designer is not the best thing for the sport.

That was a good, plain talk which Deputy Surveyor Smythe, of the port of New York, gave to motor-boat men last month. He referred particularly to the complaints of dwellers along Riverside Drive of the noise produced by the exhausts of gasolene engines, and said that the boats would grow more generally popular with everyone when pains were taken to muffle the sounds as much as possible. Owners of motor boats and small steam yachts, he said, seemed to have an idea that the Government should not attempt to make them observe regulations in regard to lights, whistles, life preservers and other appliances looking towards safety in navigation. This attitude, Mr. Smythe said, was inimical to the best interests of motor boating, and the enforcement of measures insuring, not only the safety of motor boats, but of other craft on bay, harbor or river, would work for the good of all concerned. The fatal collision between motor boats in Jamaica Bay early in November, and other numerous instances of reckless handling which have occurred during the past summer, give peculiar point to Mr. Smyth's words, and it is the duty of every motor-boat man to assist the Government in every way. We do not believe that the Government will be unreasonable in any regulations they may impose.



CROSSING THE LINE IN A BUNCH. TRIAL RACES OF THE *Sonderklasse* AT MARBLEHEAD.



REBEL. A SUCCESSFUL RACEABOUT, BUILT FROM THE PLANS PUBLISHED IN YACHTING.

With Our Readers

IN the March issue of YACHTING for this year we published the plans, specifications and building instructions of a 15-foot raceabout, designed especially for our amateur builders by Mr. John A. Connolly, Jr., of Brooklyn, N. Y.

We take pleasure in publishing some photographs and the record of one of these little flyers, which was built from the plans by Mr. Claude Guise, of Chicago, Ill., a member of the Jackson Park Yacht Club. Mr. Guise has named his boat Rebel, and has turned out a fine piece of work for an amateur. The entire boat, including material, sails, rigging, blocks, etc., the quality and quantity of which were not slighted, cost him the sum of $202.50, and he informs us that he could build another one "lots cheaper."

REBEL ON THE WIND.

Here is her racing record, sailing against boats in the 20-foot class:

June 27—5½ miles. Finished second to Wenonah, being allowed in this race 2 minutes and 5 seconds.

July 4—12 miles. Finished second to Little One, being defeated by 2 minutes and 13 seconds.

July 17—5 miles. Finished second to Wenonah, losing by 3 minutes and 5 seconds.

September 5—To Michigan City, 27 miles. Defeated Wenonah on time allowance by 3 minutes 54 seconds.

The champion Wenonah, which Rebel had to meet in all her starts, was handled by a good crew, the skipper being considered one of the best on Lake Michigan; so Mr. Guise had at all times fast company to compete against, both as to boat and crew.

Next season it is the intention of Mr. Guise to change Rebel into a keel boat by the addition of a few more feet of draft, carrying her present keel lower and inserting the necessary deadwood; and he therefore feels confident of greater success for the season of 1909.

Both Mr. Guise and Mr. Connolly have every reason to feel proud of Rebel's showing, and the former advocates strongly the adoption of her lines for a one-design class by any yacht club thinking of building, whether for shallow water or deep.

A HANDY METHOD OF DETERMINING SPEED

IF any one has made a voyage in an old-time, Down-East coasting schooner, or on a Grand Banker, he has probably been surprised at seeing the mate, when it was time to write up his log, take a squint over the quarter at the white water swirling along the lee rail, and then go below and put down the rate and the distance run, without a sign of a taffrail log trailing astern or the old-fashioned chip log—if, indeed, either of these could be scared up aboard. From long practice they are able to gauge the speed so accurately that even on soundings, when their position is most important and practically all of their sailing is by dead reckoning, they get surprisingly good results.

Most of us are familiar with the old method of determining a boat's speed by throwing a chip overboard abreast of the bow and taking the time that elapses until it passes the stern; which, of course, is on the principle of the foregoing. We used to work out the result—and had to repeat it every time—by the cumbersome method of dividing the number of seconds taken by the chip into 3,600 (the number of seconds in an hour) and multiplying the quotient by the length of the boat, dividing the product by 5,280 (the number of feet in a mile), to get the rate per hour.

We reprint from "Binnacle" a formula which is a short cut on this old method.

If you multiply the length of your vessel (from bow to stern) by the decimal .682 you will obtain a small and convenient figure, which we will call a constant, which you can use by mental division under the following rule:

Divide the constant by the time taken and the result will be the speed of the yacht in statute miles per hour.

For example: The constant for 40 feet length is 27.3. The time of the chip passing was taken and found to be 5½ seconds. Divide 27.3 by 5.5; you find the speed to be a trifle less than 5 miles per hour.

The above rule is evolved from the following proportion:

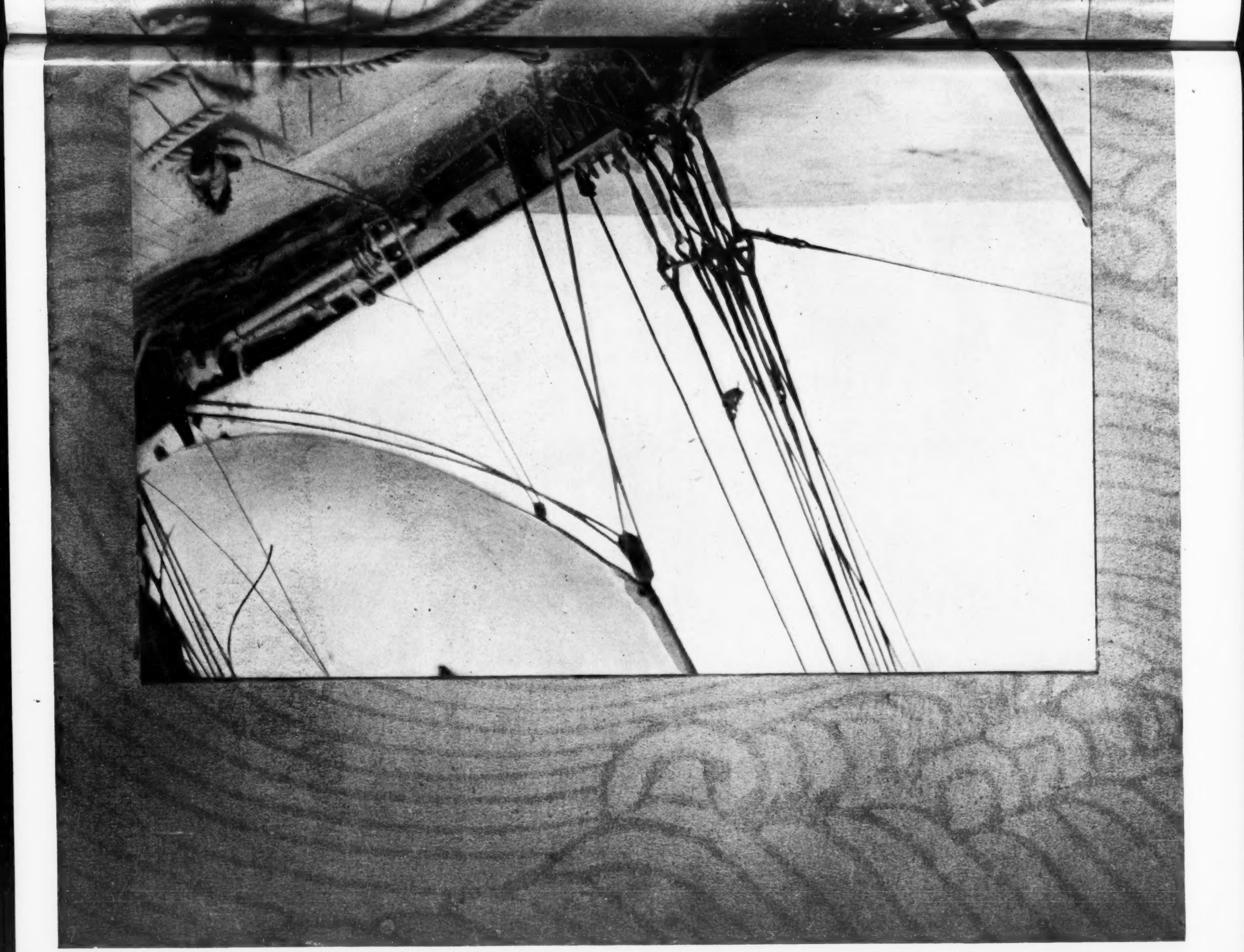
5,280 : 3,600 :: length of vessel : x

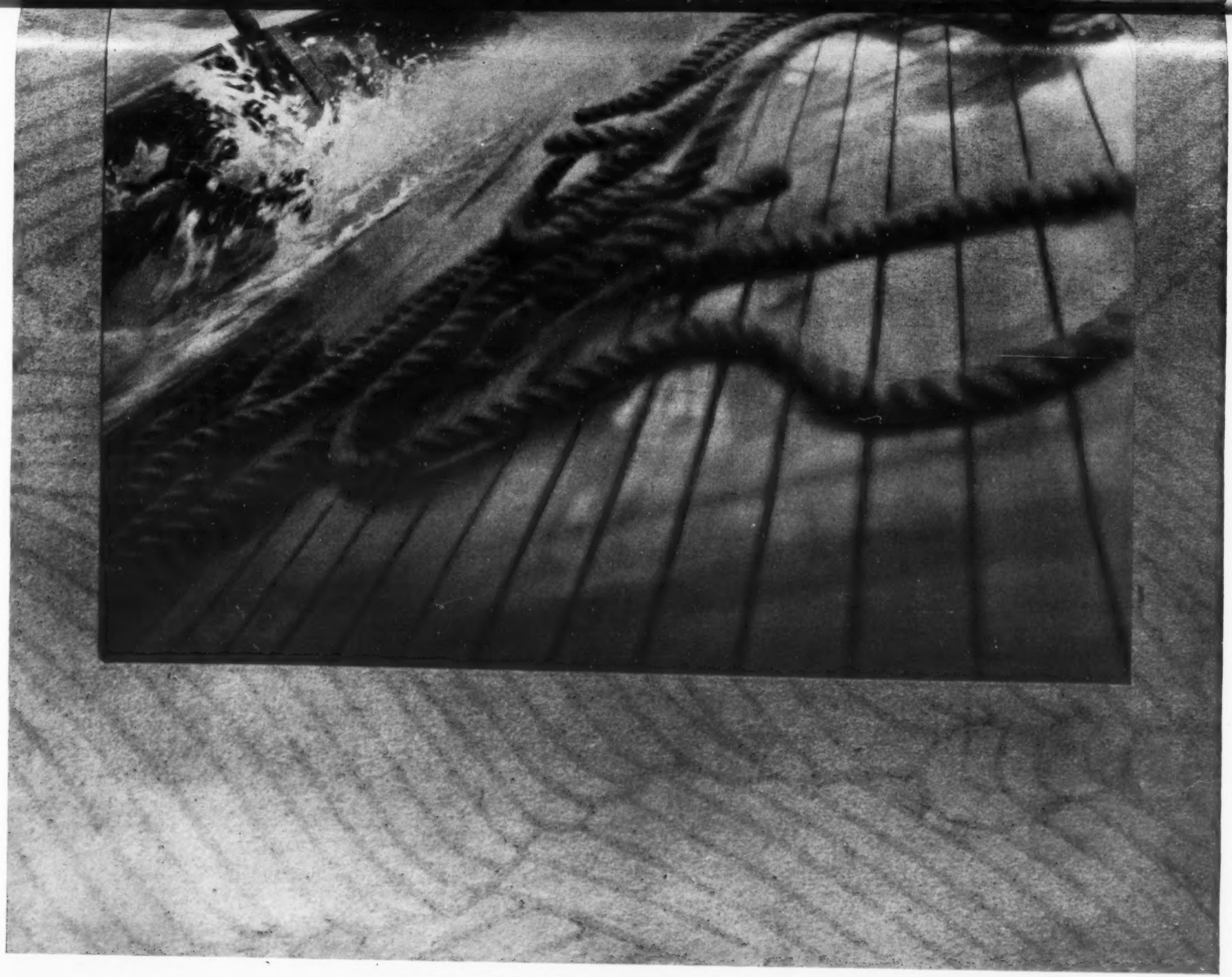
in which "x" is the constant sought.

That is, the number of feet in a statute mile bears the same relation to the number of seconds in an hour as the length of the vessel bears to the constant sought. For example: If the speed is 1 mile per hour (5,280 feet in 3,600 seconds), the vessel will go its own length in the certain number of seconds represented by the last term of the proportion; that is, "x"—the constant sought. And the vessel will, therefore, go as many lengths in the number of seconds represented by the constant as it is sailing miles per hour.

In practice the constant can be made a whole number by disregarding the fraction; that is, by striking off the fraction if it is less than .5; or by striking off the fraction and adding 1 to the whole number if the fraction is greater than .5. The resulting error will be but a very trifling percentage of the speed.

The following are the constants for certain lengths. You can see how they work out:



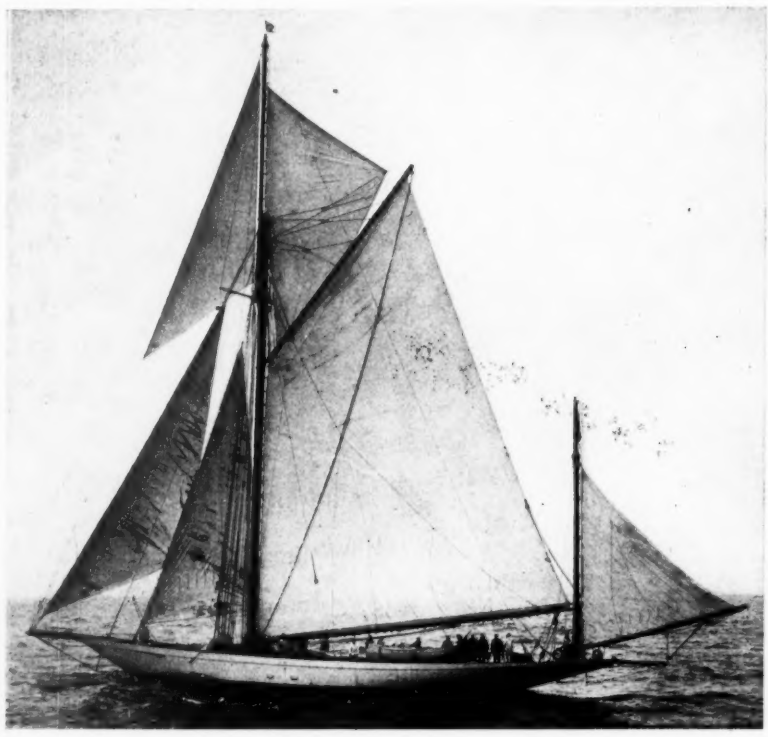


INTO A HEAD SEA. ZUHRAH EXPERIENCES A WET MORNING IN THE GULF STREAM.

Length used.	Constant (for statute miles).
20	13.6
25	17.0
30	20.5
35	23.9
40	27.3
45	30.7
50	34.1
55	37.5

If you wish a constant for nautical miles, multiply the length of your vessel (from bow to stern) by the decimal .592 and apply the same rule as above. This decimal is evolved by proportion, the same as the other, using the length of a nautical mile (6,080 feet) in place of the length of a statute mile.

MORE ABOUT THE YAWL RIG



AILSA. NOTE THE RELATIVELY SMALL SIZE OF HER JIGGER. IF THE MAST HAD BEEN STEPPED NEARER THE RUDDER HEAD, A MUCH LARGER SAIL COULD HAVE BEEN CARRIED.

WE print below some letters we have received from owners of yawls, in which they take issue with Mr. Stevenson on his criticism of the rig as shown by the performance of Ailsa in the Atlantic race of 1905:

EDITOR OF YACHTING:

CHICAGO, ILL.

DEAR SIR:—Mr. Stevenson's criticism of the yawl rig should call forth protests from owners of yawls. His statements do not agree in any way with my experience, and I have lived aboard yawls during the summer seasons and sailed in everything that blew. It is true that the sail area is broken and is not as effective for racing as the sail area of a sloop. To offset this, however, the canvas of a yawl is much easier to handle, and for heavy weather has untold advantage over a sloop or cutter. Anyone knows this who has blown the mainsail off a sloop. As to the jigger being out of commission when running, that is when it is most effective, for it is spread out like a wing in front of the breeze. It is a sail with little driving power when everything is close-hauled, on account of the way the jigger sheets run; but when slightly off the wind its effectiveness is certainly felt. When it comes to shortening sail, a yawl can drop her mainsail and sail under jib and jigger when a sloop would make bad going under three reefs. Mr. Stevenson regards as ridiculous the idea of "heaving to" with jib and jigger. To those who have had experience in heavy weather on board yawls this does not appeal as a sensible statement. On all yawls I have been on it has been successfully done, although a storm trysail, lashed on the main mast, works equally well. When a yawl has little headway and the jigger is flat, it is hard to bring a yawl about, but by easing the jigger slightly she will fall off easily. This may have been the reason the Ailsa acted like a rudderless ship. I have had no experience on yawls over 50 feet, but on our own boat and others on which I have sailed, the yawl is the handiest rig I have found, and the most comfortable for all-round work. Respectfully,

EDWARD BECKER.

This is what the owner of Gwendolyn II, which finished second in the trans-Pacific race, has to say:

EDITOR OF YACHTING:

SEATTLE, WASH.

SIR:—I have been reading in YACHTING some interesting discussions on the rig of the yawl. As I am the owner of the yawl Gwendolyn II, which participated in the trans-Pacific race, I have had some experience with the rig.

Running before a heavy wind and sea, my boat buries herself by the head, and during the race the jigger was lowered while sailing before the wind.

The yawl is a fine rig for off-shore work in anything but running dead before it. The advantage over the schooner is that all the large sails are inboard, thus facilitating reefing. As the jigger of Gwendolyn II is a large sail in proportion to her mainsail, it gives her good driving power. We sail to windward with jib and jigger if a squall suddenly strikes us. The rig of the Gwendolyn II is well designed, her jigger is stepped close up to the rudder head, thus getting the full efficiency of the sail. It might be added that we carry more sail than most outside cruisers—2,000 square feet on a 39-foot waterline. The fault with Mr. Stevenson's yawl is that her jigger is too small. In sailing, but little power can be obtained from such a small sail.

Yours truly,

LLOYD JOHNSTON.

These men have stated their case well, and we should be pleased to hear from others who may feel that they have light to shed on this interesting subject. There is no doubt that the majority of those who have handled the yawl rig are enthusiastic over its possibilities. As regards Mr. Johnston's contention that it may have been due to the small size of Ailsa's jigger that caused Mr. Stevenson to reach the conclusions he sets forth, we are inclined to the same opinion. In this race Ailsa's jigger, or spanker, was a small trysail with no gaff, and totally out of proportion to the size of her mainsail. The sail could have had but little driving power, was of a size hardly able to hold her head to the wind, and, from the photographs we have seen of it, did not even fit as well as it might. It is a mistake also to have the jiggermast set so near the end of the overhang. The step is so shallow as to give little support, all the strain comes on the stays, and, if a gaff is carried, the mast would not stand much of a blow. If it were stepped nearer the rudder head more stability could be had and a much larger and more powerful sail could be carried. As far as heaving-to under jigger to ride out a blow, we doubt the sail's effectiveness, believing that a trysail set on the mainmast is the proper sail for such an emergency, if that mast is not stepped too far forward. In fact, I do not think that this is one of the functions of the jigger, as in heaving-to whatever sail is carried should be more nearly amidships to get the best results. I have seen two-masted schooners ride out a hard gale under a trysail set on the mainmast (just aft of amidships), with a becket on the wheel and all hands below, while their vessel would "lay-to" as easy as an old shoe, making just enough leeway to keep the seas from breaking aboard.

In our November issue the caption of one of the illustrations of the Cape May race said that Marchioness, one of the contestants, went aground during the race. This is an error which we wish to correct, as it was Butterfly, and not Marchioness, that hung up on the Jersey sands. Not only did Marchioness not go aground, but, ably handled by Warren Sheppard, she finished third in the race.

A 15-Foot, One-Design, Knockabout

THERE bids fair to be some interesting small-boat sailing on Great South Bay next season, as Messrs. Cox & Stevens have prepared plans for a one-design class of knockabouts for the members of the Cedarhurst Yacht Club, whose headquarters are at Lawrence Beach, Long Island. Already eight boats for this class are under way at the yard of Warren Purdy, at Amityville, for delivery early next spring, with the chances in favor of a full dozen being in commission by Decoration Day.

These boats will contest in weekly class events, to be held by the club throughout the season, and will also meet the boats of various Great South Bay yacht clubs in match races.

The boats have been designed with a view to their giving a good account of themselves either in the inlet or on the ocean, and have been given good freeboard, moderate overhangs and fairly sharp sections, as will be seen by referring to their lines, which are shown herewith.

The design does not run to extremes in any particular, and should produce an able craft under all ordinary weather conditions.

As the prevailing summer winds at Lawrence are much fresher than on the Sound, they have been designed to carry their sail-spread in a fresh breeze.

The dimensions are as follows: length over all, 22 feet; on waterline, 15 feet; beam, 6 feet 6 inches; draft, 2 feet. They are copper-fastened throughout, with keel and stem of white oak, planking of ¾ inch white cedar, frames of white oak, spaced 10 inches from center. The deck is of ⅝-inch white pine, canvas-covered; coamings and plankshear of quartered oak, bright finished. All the blocks will be of bronze, the deck cleats of oak, and standing rigging galvanized.

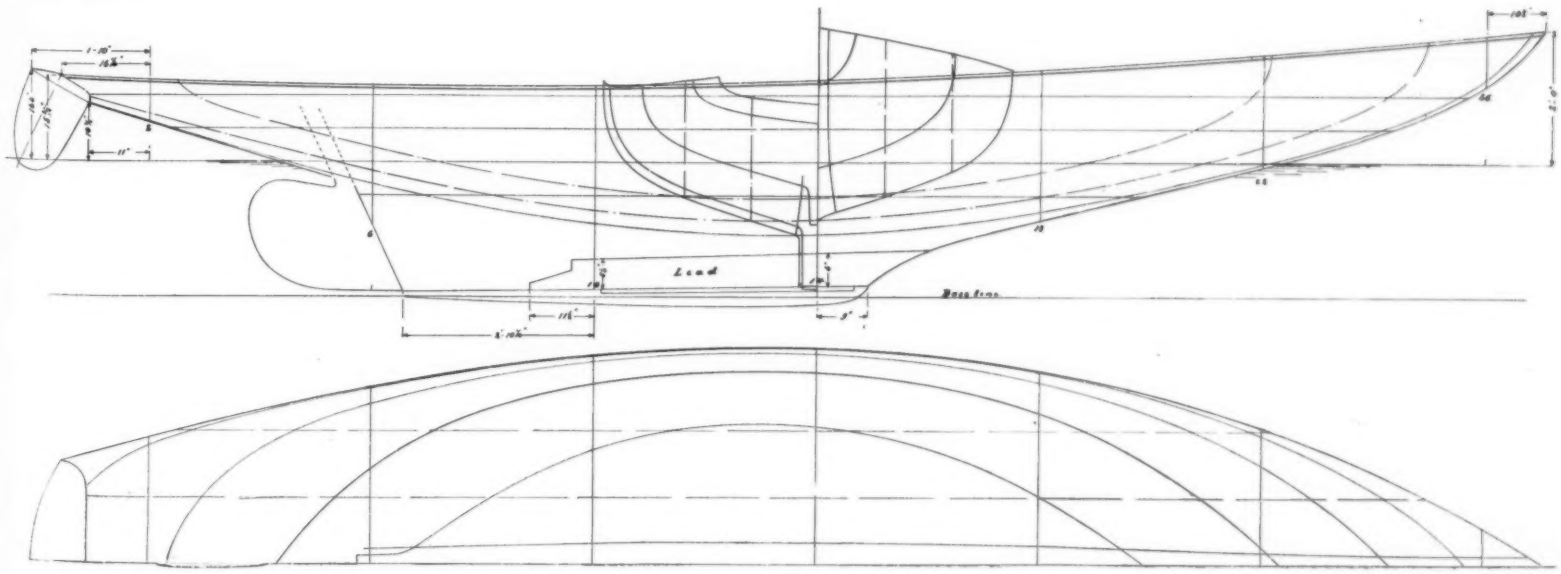
The sail area will be 250 square feet and made of special duck, and there will be 800 pounds of lead on the keel.

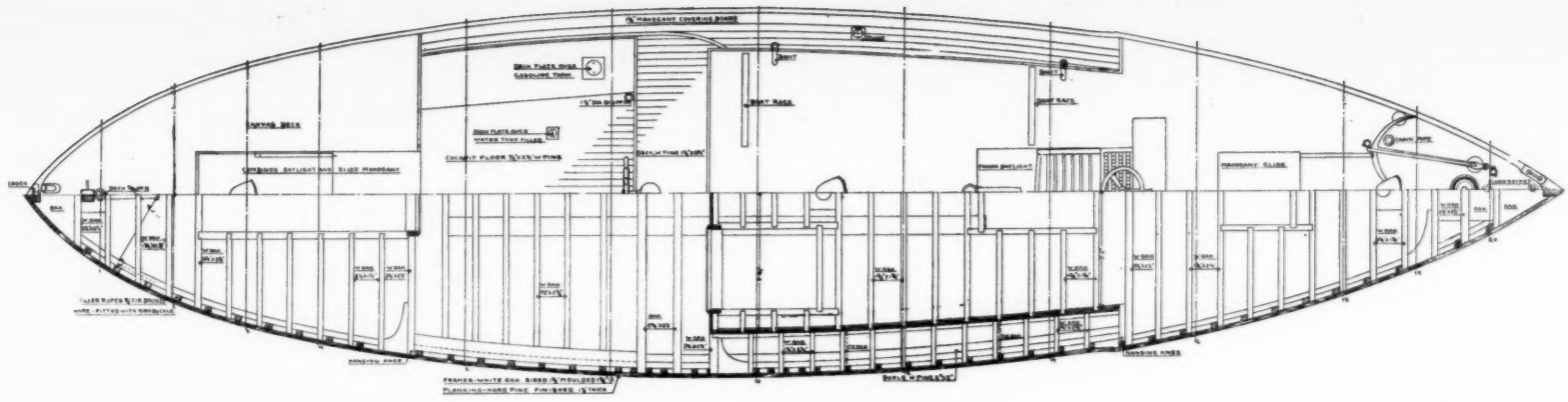
An air chamber of sufficient buoyancy to keep the boat afloat has been provided.

Taken as a whole, they are neat, wholesome little fellows, well adapted to afternoon sailing, and as a class may be calculated upon to furnish interesting club and inter-club contests during the season.

This class represents a very desirable type of small craft, and one so peculiarly adapted to the requirements of a large number of sailing men that it will undoubtedly gain great popularity during 1909. Her designers state that her cost does not exceed $500 if built to these specifications.

The many good points, combined with the moderate cost at which they may be built—an item of consideration not to be lightly passed over—gives us reason to believe that they will make their appearance at other places than Great South Bay before the season is over.



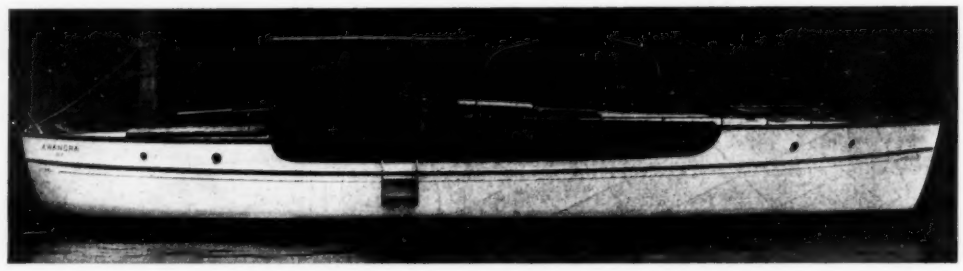


A 42-Foot Double-Cabin Cruiser

AWANDRA, designed for A. T. Wells, of Brooklyn, N. Y., by Small Bros., of Boston, and built by Rice Bros., is a power cruiser presenting so many good points, and possessing so much that is new in the way of thoroughly practical ideas in regard to arrangement, that a perusal of her plans will interest every power-cruising enthusiast.

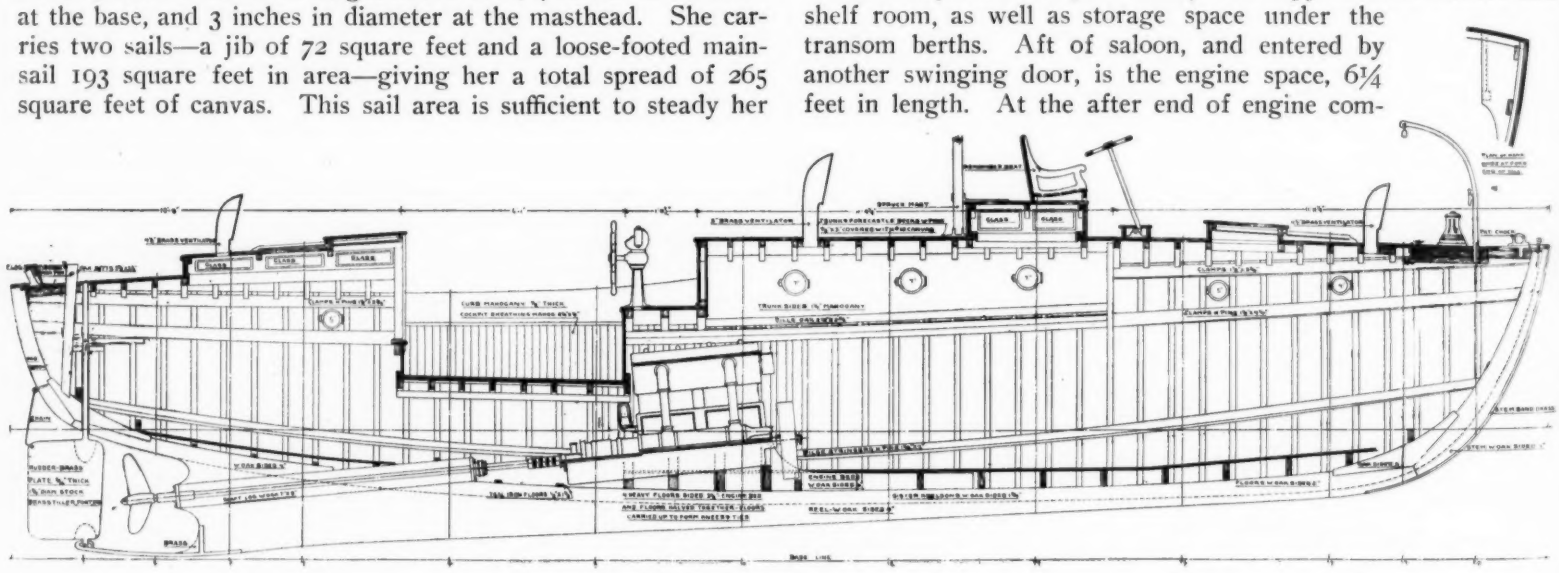
She is 42 feet over all, 38 feet 3 inches on the waterline, 10 feet beam, and draws 3 feet 6 inches of water at skeg. Her freeboard at bow is 5 feet, at stern 4 feet, her least freeboard being 2½ feet. She has a round bow, a compromise stern, and is of the double-cabin type, with a midship cockpit, which has come into use somewhat during the past few seasons. Her forward cabin is of the combination raised deck and trunk type. The sides extend the full width of the boat for 11 feet, at which point they are brought in toward the center in the form of a trunk, leaving a side deck about 18 inches wide; 23¼ feet from the bow the forward cabin ends and the 16-foot cockpit commences. The deck at the forward end of the cockpit is carried across in the form of a bridge, covering the rear portion of the engine, and on this bridge is mounted steering wheel and binnacle. Aft of the cockpit is an after cabin, 7 feet in length, and extending the full width of the craft, with a skylight, 2½ feet in width, giving 6 feet headroom in the center. She has a mast 19 feet 10 inches in height above deck, 4 inches in diameter at the base, and 3 inches in diameter at the masthead. She carries two sails—a jib of 72 square feet and a loose-footed mainsail 193 square feet in area—giving her a total spread of 265 square feet of canvas. This sail area is sufficient to steady her in rough weather, or allow her to make port with a fair wind. All standing rigging is of galvanized wire; all blocks, cleats and other fittings, of brass. On the forward deck are anchor, davits, capstan and a large cowl ventilator; and just forward of the mast is a removable thwart-ship seat, immediately in front of which an automobile steerer gives control of the boat when desired. This seat is mounted on a skylight situated immediately over the main saloon. A brass railing gives protection to the crew when handling the moorings on the forward deck, and this railing also extends aft in the form of a guard rail, protecting the forward side deck as far back as the forward end of the cockpit coaming.

So much for the deck plan. Below, the refrigerator is located in the bow, just aft of the engine locker, and between the refrigerator and the ceiling are provision shelves. Aft of the refrigerator are the galley and crew's quarters, with folding berth on port side, dresser, sink, stove stand, dish racks and lockers on the starboard side, with a large locker extending the full height of the cabin immediately aft of the stove. A sliding deck hatch gives access from this compartment to the forward deck, and a swinging door leads aft into the main saloon, which has transoms on each side and a folding portable table in the center, a clothes closet on the port, and a sideboard on the starboard side forward.



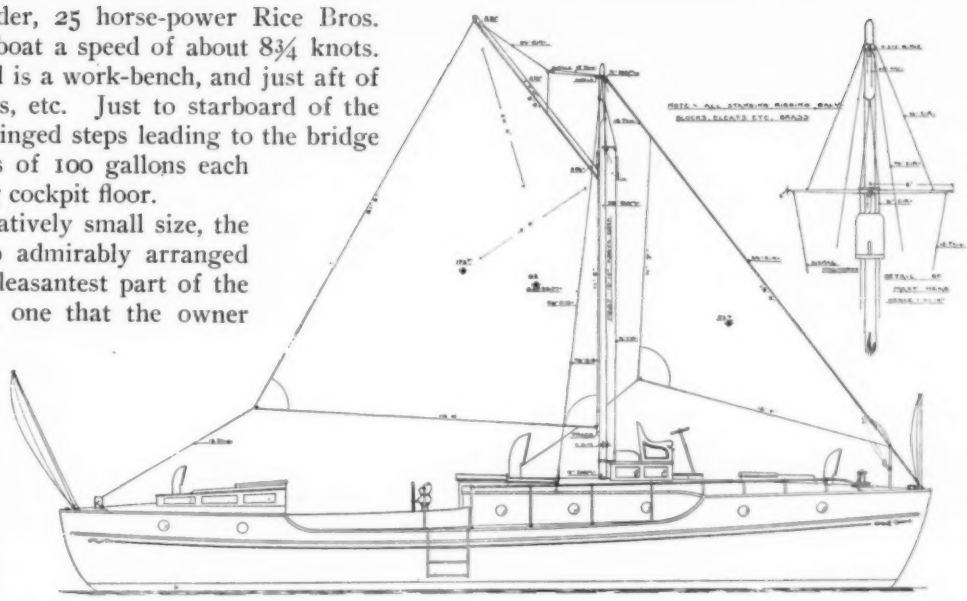
AWANDRA, A DOUBLE-CABIN POWER CRUISER, WHOSE AFTER QUARTERS ARE PARTICULARLY ATTRACTIVE.

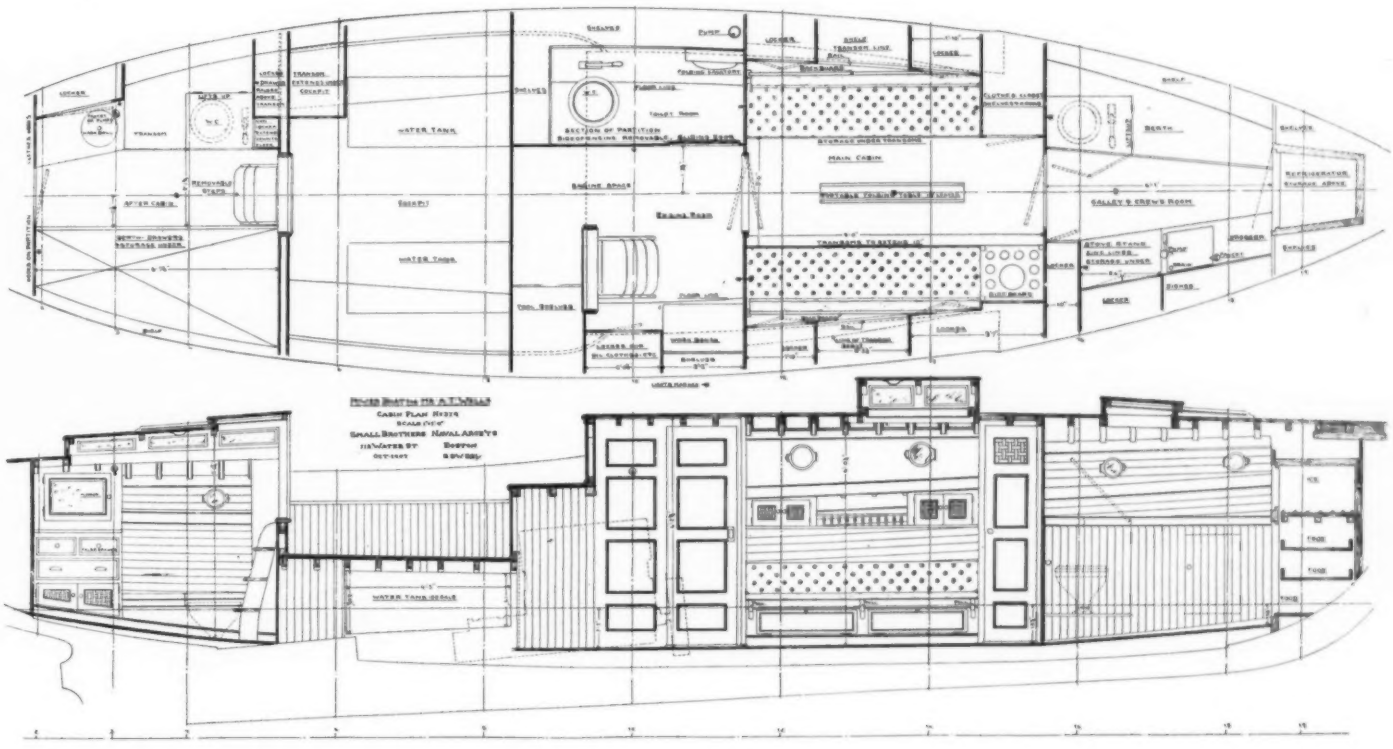
This compartment is particularly well supplied with lockers and shelf room, as well as storage space under the transom berths. Aft of saloon, and entered by another swinging door, is the engine space, 6¼ feet in length. At the after end of engine com-

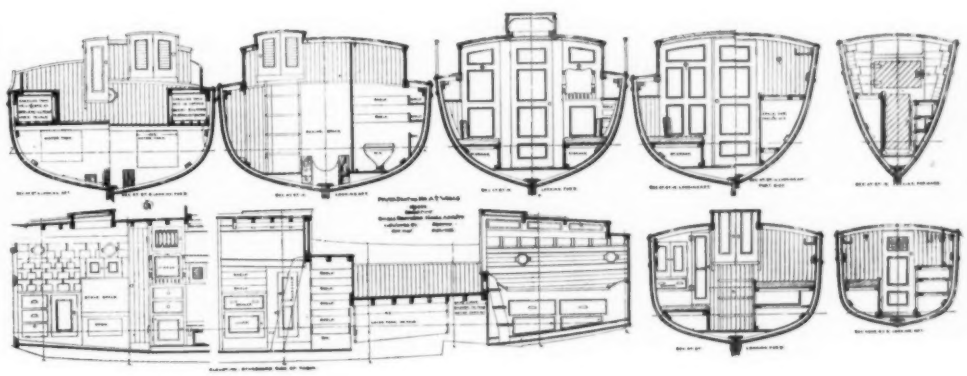


partment is the 4-cylinder, 25 horse-power Rice Bros. motor, which gives the boat a speed of about 8¾ knots. On the port side forward is a work-bench, and just aft of this a locker for oilskins, etc. Just to starboard of the center of the room are hinged steps leading to the bridge deck. Two water tanks of 100 gallons each are under the self-bailing cockpit floor.

In spite of its comparatively small size, the after cabin has been so admirably arranged that it is probably the pleasantest part of the craft, and certainly the one that the owner would be apt to utilize for his personal use. Removable steps lead into it from the after end of the cockpit. On the starboard side is a berth 6 feet 7¼ inches in length, and with an average width of 3 feet, with drawers and storage space underneath. On the port side is another transom extending forward under the cockpit floor, so that in reality it is a double cabin. It is well supplied with locker space, and has a wash-basin with pump, clothes racks and gun locker. This compartment is lighted by two 5-inch hinge port lights, one on each side, and six large glass windows in the cabin skylight, and it has, in addition, a 4½-inch ventilating cowl. A swinging door gives entrance through the after bulkhead of this cabin into the storage space under the after deck.

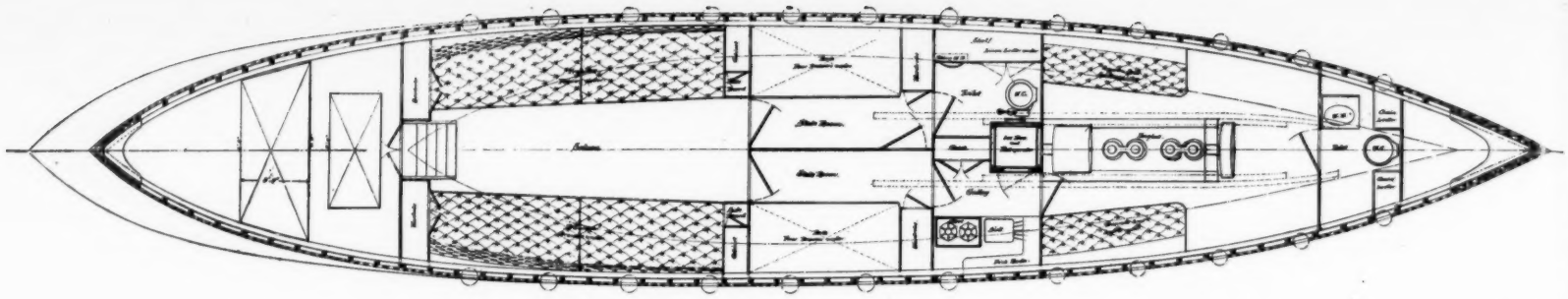






As a gunning, fishing and cruising craft Awandra possesses capabilities which render her plans an interesting study to that class of motor-boat owners who consider their craft as a means more than an end.

She is a well-appointed floating hunting lodge, and a fishing boat whose generous freeboard and general seaworthiness will allow her to make runs to outside grounds, and she should behave well in a good-sized blow. At the same time, her comparatively light draft—42 inches at the extreme—will permit her to run through shoal waterways and up creeks and inlets whenever it is desired. The forward deck space is available in smooth water, and the cockpit amidships, with the sense of security and comfort which it gives in rough seas, make Awandra an extremely good cruising boat for any kind of weather. The absolute isolation of the after sleeping quarters from the rest of the boat, combined with its independent conveniences, is a point which will be readily appreciated.

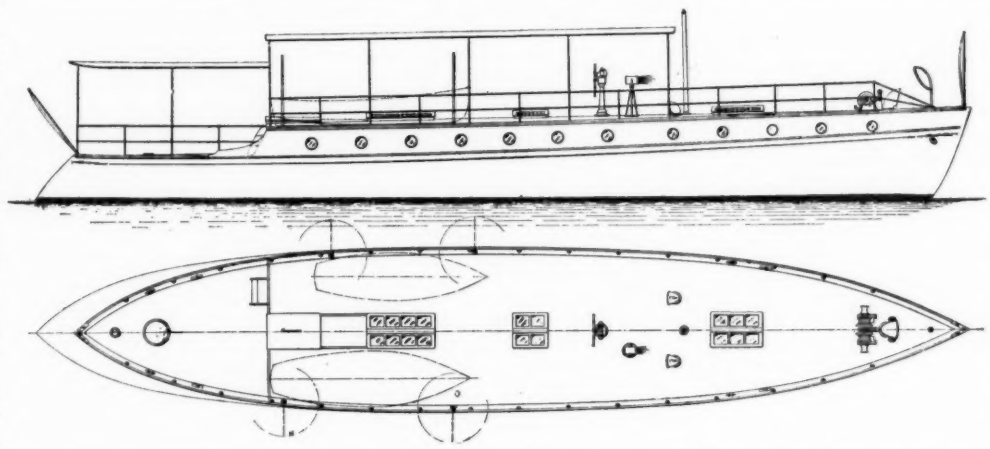


A 66-Foot Pacific Coast Power Cruiser

THE rapidly-growing fleet of yachts on the Pacific Coast will be increased by the addition of a new craft for Mr. William Letts Oliver, of Oakland, Cal. Mr. Oliver is an ardent yachtsman, and has been identified with the sport for thirty odd years. His new craft will be a modern, up-to-date motor boat, built from plans and specifications furnished by Mr. Henry J. Gielow, of this city.

The principal dimensions of the new craft will be as follows: Length over all, 66 feet; length on load waterline, 63 feet 4 inches; beam, extreme, 11 feet 8 inches, and 4 feet 6 inches draft.

The hull will be constructed of wood, the keel, stem and stern post being of white oak, the frames of selected white oak, steamed and bent, while the planking and deck will be of Oregon pine in long lengths. Exceptional structural strength has been obtained by carrying the sides of the hull up from the stem for a distance of 50 feet, thus forming a flush-deck vessel with ample headroom. Numerous air ports and skylights have been provided, so as to secure plenty of light and ventilation, and, in addition to this, the engine room is fitted with a device especially designed to insure complete change of air every three minutes. She has a bow of moderate rake and torpedo stern. From her after deck, 7½ feet in length, entrance to the saloon is by means of a centrally-located companion hatch and a flight of five steps. Her forward deck is broken only by a companion hatch and three skylights—one over the saloon, one over the staterooms and one over the engine compartment. Both after and main decks are protected by a pipe rail on stanchions. The entire after deck and that portion of the main deck aft of the signal mast are shaded by a canvas awning stretched on removable pipe frames. Just aft and on each side of the signal mast are two 7-inch ventilating cowls, and aft of these will be the searchlight and a combination binnacle and steering gear. She will carry two boats.

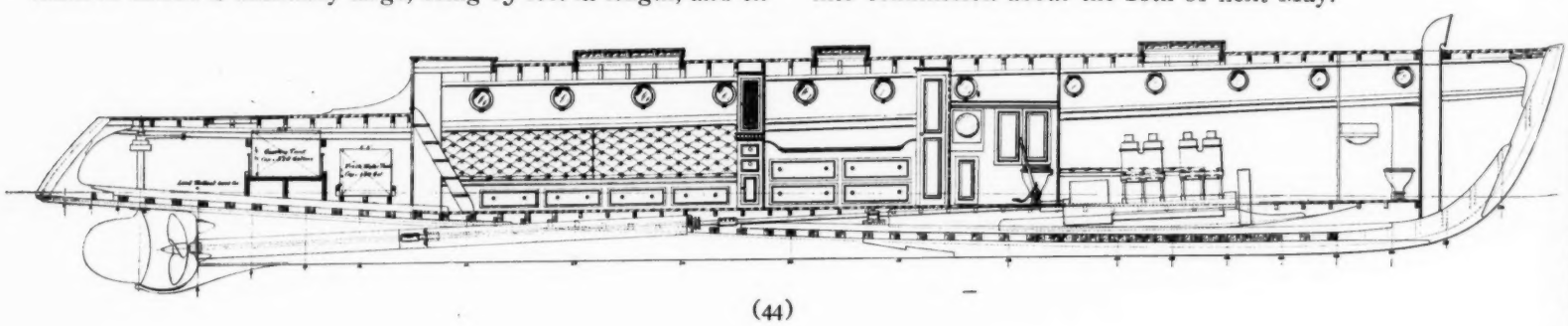


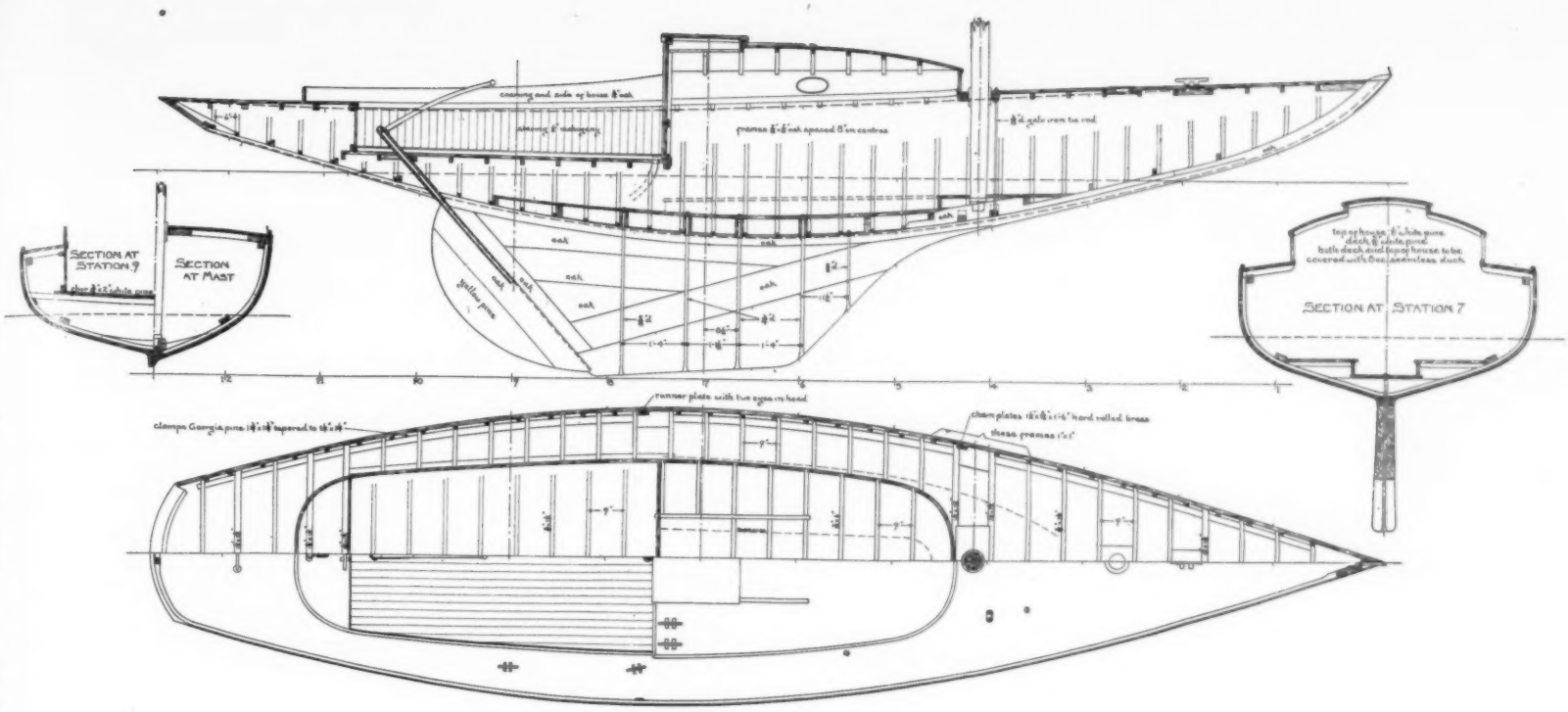
As this yacht will be used principally as a day boat, the main cabin or saloon is unusually large, being 15 feet in length, and extending the full width of the vessel. At the after end of this saloon, on each side, is a wardrobe, and at the forward end, on each side, is a sideboard with a cabinet for glasses, crockery, etc. Extending along the sides are divans, handsomely upholstered, and arranged to draw out and form berths. The space under the divans is fitted with drawers for storage. Forward of the main saloon will be two staterooms, each 8 feet in length, and fitted with a double berth and large wardrobe. Under the berths will be drawers. Forward of the two staterooms, on the starboard side, is a galley with dresser, sink, dish-rack, ice box and storeroom complete. Opposite, on the port side, is a lavatory fitted up with the latest plumbing. Forward of these comes the engine room and crew's quarters, 12 feet in length, extending the full width of the vessel, and forward of this will be a toilet room with wash basin and lockers. The fronts of berths, transoms, sideboards, etc., will be of mahogany, finished bright, and the rest of the woodwork will be of white pine, finished in white enamel paint with sufficient line gilding to make it attractive. The skylights and deck fixtures will also be of mahogany, finished bright.

The propelling machinery will consist of a four-cylinder Doak engine, developing 60 horsepower at 400 revolutions per minute, which will drive the yacht at a speed of about 14 miles per hour. The work on this engine is well along, and it will be ready for delivery in about thirty days. The gasolene tank will be aft under the cockpit floor, enclosed in a watertight compartment, and arranged to drain outboard. The shafting will be of Tobin bronze, and the propeller of manganese bronze, three-bladed, especially designed by Mr. Gielow for this boat.

It has been aimed to make this boat draw as little water as is consistent with good weatherly qualities, so that she will be able to enter the shoals, bays and streams of the coast.

It is expected that the boat will be completed and ready to go into commission about the 20th of next May.





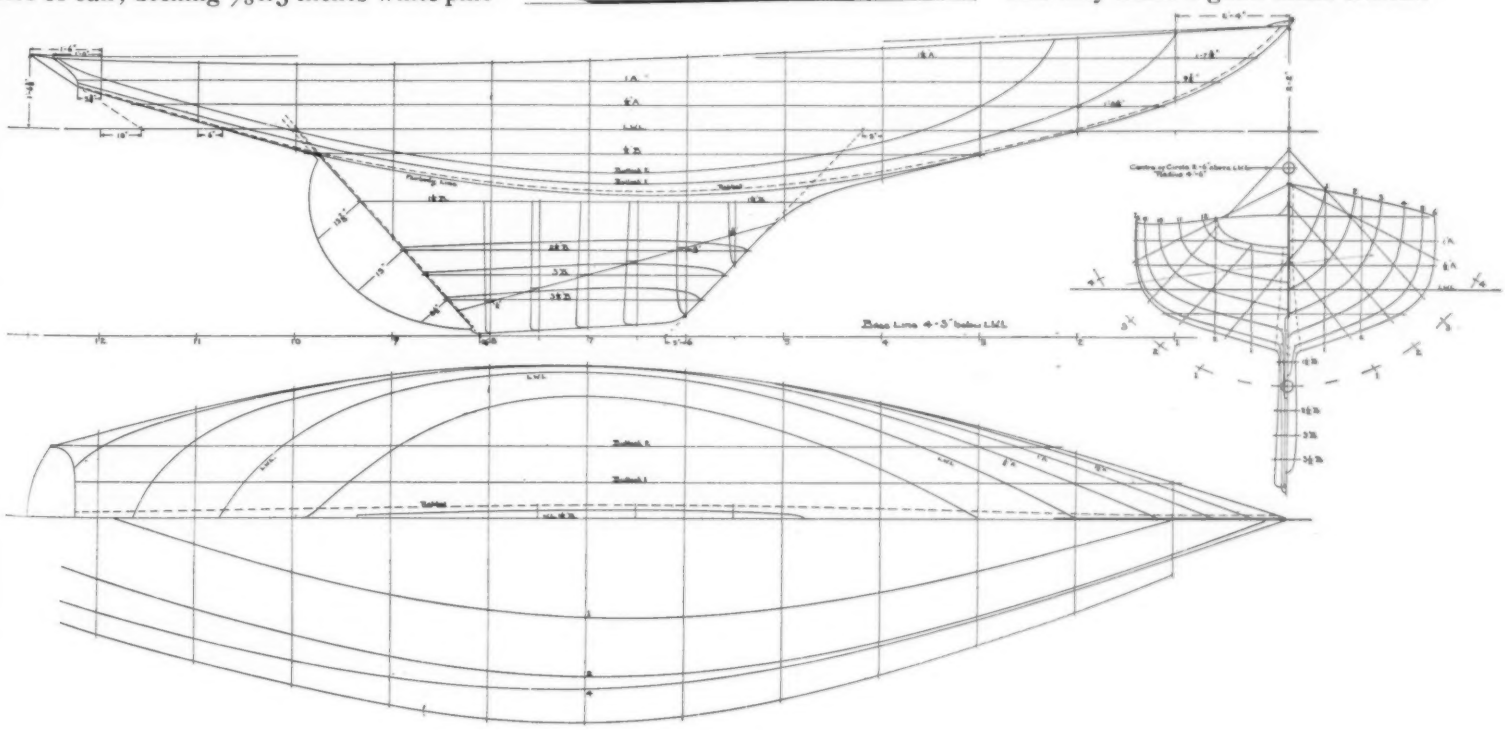
Manchester Yacht Club One-Design Class

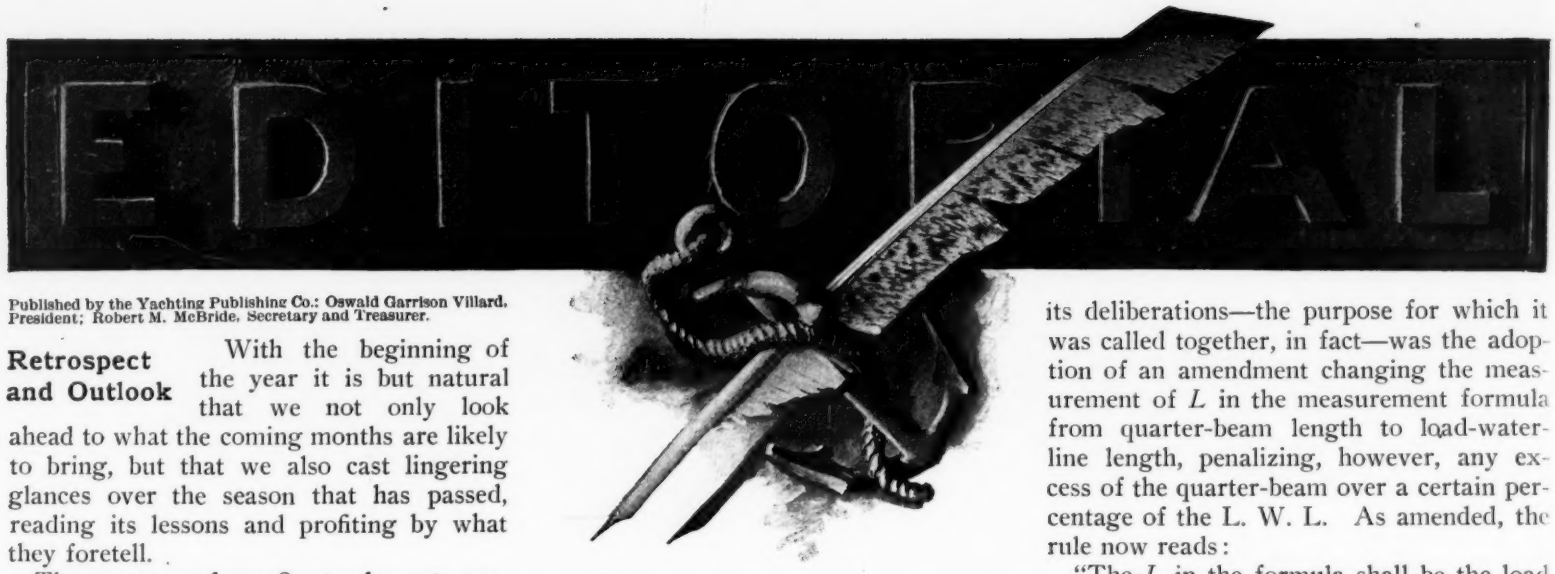
THE accompanying plans are of a 17-foot 6-inch waterline boat for the Manchester Yacht Club one-design class, designed by Crowninshield and built by Rice Bros., which is to be exhibited by Arthur P. Homer at the Boston Motor Boat Show.

Her dimensions are: 25 feet 10 inches over all, 17 feet 6 inches L. W. L., 6 feet 3 inches beam, 4 feet 3½ inches draft, with 1,500 pounds outside lead, and she will carry 310 square feet of sail. Her frames are of selected white oak, ⅞ x ⅞ inches, spaced 8 inches on centers, the four frames abreast of the mast being 1 x 1 inch. The planking is of ¾-inch white cedar, copper fastened; floors of oak; decking ⅝ x 3 inches white pine covered with 8-ounce seamless duck. Keel is of oak, sided 6½ inches amidships, tapered at ends, while stem is of oak crook sided 2 inches and moulded.

This class was designed to build up the interest in small-boat racing in Massachusetts Bay, and at the present time there are twenty-five of the boats under way. Among the prominent yachtsmen who have already placed orders for them are: A. C. Needham, C. E. Hodges, George Lee, Geo. Wigglesworth, Barker Bremer, H. W. Friend and E. C. Chase.

While they are intended primarily for afternoon sailing and racing, these boats have a small cabin, with two transom berths, so that they make a good small cruiser.





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Retrospect and Outlook

With the beginning of the year it is but natural that we not only look ahead to what the coming months are likely to bring, but that we also cast lingering glances over the season that has passed, reading its lessons and profiting by what they foretell.

The season of 1908 stands out pre-eminently as a small-boat year; and instead of its proving a dismal failure from a racing standpoint, as was predicted, it developed into a remarkably successful one through the efforts of the small-boat sailor. While the financial conditions were undoubtedly responsible for the "leanness" of the entry lists in the larger classes, we do not believe that it was due entirely to the absence of the large boats that made the success of the smaller classes so pronounced. More and more the small-boat sailor is coming into his own, and the yacht clubs are beginning to wake up to the fact that it is the man that sails his own boat from an inborn love of the sea, without the aid of a professional crew, who is the backbone of the sport..

The success of the long-distance and ocean races, which more than anything else served to lift the season above the mediocre, was due to the small boat. Most of the races brought a goodly number to the line (from thirty-one in the Block Island race, down), and the large boats could be counted upon the fingers of one hand, the old Shamrock being the largest of them. We should like to see more of this long-distance ocean racing. There is an attraction about it for the corinthian that amply repays for the hard work, long hours, broken rest and possible discomfort. There are a number of ocean events already booked for 1909 which we expect to see successfully pulled off. We even hope to see new events of this character projected. There are plenty of good courses along the coast that have not yet been tried that would make ideal races of from 24 to 50 hours' duration, and should prove attractive. After competing over the same course a number of times the average corinthian "hankers" to try unknown waters again.

Of international racing in the smaller classes we shall have enough next summer to make the season an assured success and furnish all the sport that the most ardent racing man can desire. The prospects now are that enough new boats will come out to make the racing in many of the older classes better than it has been for several seasons, as the yards all report plenty of work in hand or in view. We have already spoken here of the prospect for a race for the Harmsworth trophy.

So much for the racing outlook. For the cruising man, the passing of the hard-times bugaboo should result in an increasing number of cruising craft being in commission, both sail and power, and the yacht clubs may consequently look forward to a stirring season both ashore and afloat. And many of the snug little coves and harbors along the coast will awaken to the splash of anchor and rattle of cable through hawse pipe as the summer day comes to a close.

What the Yacht Conference Did

The much-heralded meeting of the Atlantic Coast Conference was held at the New York Yacht Club on December 2, and succeeded in accomplishing what had been left undone at the previous meeting of the Conference in October. The chief result of its deliberations—the purpose for which it was called together, in fact—was the adoption of an amendment changing the measurement of L in the measurement formula from quarter-beam length to load-waterline length, penalizing, however, any excess of the quarter-beam over a certain percentage of the L. W. L. As amended, the rule now reads:

"The L in the formula shall be the load waterline plus one-half the excess of the quarter-beam length over the percentage of the load waterline given by the formula,

$$\text{Percentage} = 100 - \sqrt{L.\ W.\ L.}$$

For vessels of over 100 feet waterline this percentage shall have as a minimum 90 per cent."

This change to L. W. L. from quarter-beam as the measure of length is not radical; it will retain the best characteristics of the rating formula, will simplify its application and restrict the present tendency towards hollow lines. It will, of course, cause some changes in the rating of several of the prominent boats, and may affect somewhat the time allowances. It will serve to bring the ratings of the smaller boats more nearly to their waterline length, which in itself should be a good thing. The L. W. L. with proper safeguards is the logical basis of measurement in any rating formula, the quarter-beam being maintained merely as an element of restriction.

We have heard various expressions as to the immediate effect of the change on the building of new boats. Personally, we do not believe that the change is radical enough to have any bearing on this side of the matter, and doubt if anyone will be deterred from building on this account. Rather we incline to the belief that it may stimulate building, in that it will place racing on a fairer and more satisfactory basis than formerly. The chief sufferers, we think, will be some of the boats that were built to "shave" the rating to enable them to race in classes to which they did not properly belong.

That the changes are intended to have a thorough try-out is evident from the following resolution, which was adopted:

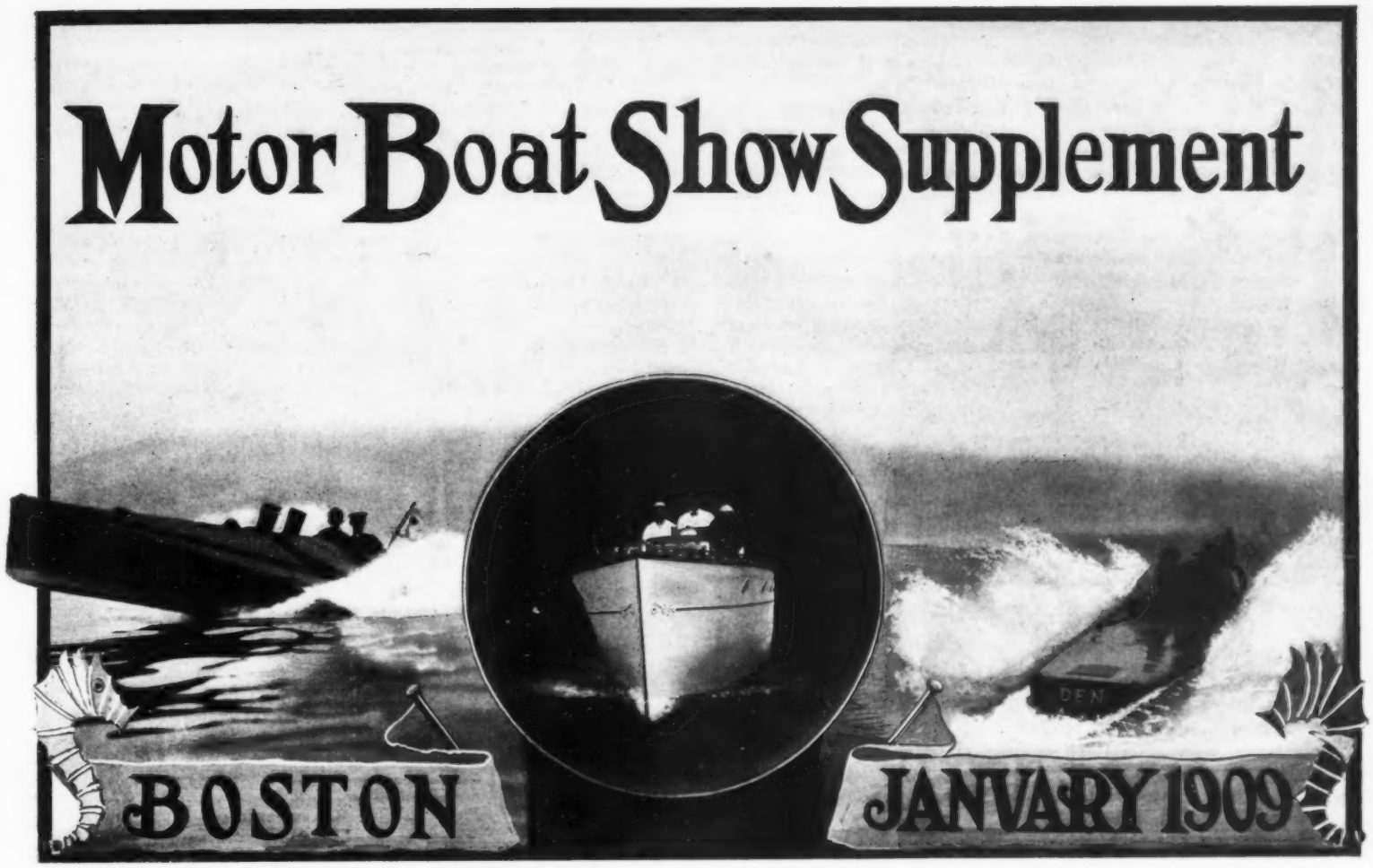
"Resolved, That it is the sentiment of the conference that the measurement rules as now adopted should stand for a sufficient number of years to warrant confidence in those intending to build yachts, and to that end no changes should be made until such time as the benefits of change will clearly outweigh the disadvantages."

International Dory Racing

As we go to press word comes that the American Yacht Club, of Rye, has definitely invited the three Royal Yacht Clubs of Holland to participate in a series of dory races here the coming summer, for which they offer a cup. Last year the Royal de Hoop Club, of Amsterdam, offered a trophy, which was won by Mr. George Gardner Fry's Tautog. It is to be hoped that the Hollanders may see their way to sending a team of at least three boats—one from each of the clubs—to compete in this event. The course of the American Yacht Club off Parsonage Point is an ideal one for small boats, and an interesting series of races should result.

Though the undertaking may seem formidable to those who have never attempted to bring a boat to this country, it should not prove such a difficult matter with a craft of the dory size. Added to the *Sonderklasse* races, and those for the Seawanhaka and Canada Cups, this will make a record season for international racing.

Motor Boat Show Supplement



The Boston Show

The National Motor Boat and Engine Show, to be held January 23 to 30, inclusive, in the Mechanic's Building, Boston, under the auspices of the New England Boat Association, and sanctioned by the National Association of Engine and Boat Manufacturers, bids fair to be a real forerunner of prosperity.

From all over the country, YACHTING has collected advance information regarding the nature of the various exhibits, and at no time in the history of the sport of motor boating has manufacturing enthusiasm run higher, or been coupled with a better showing of improvements in design and detail of both engines and accessories.

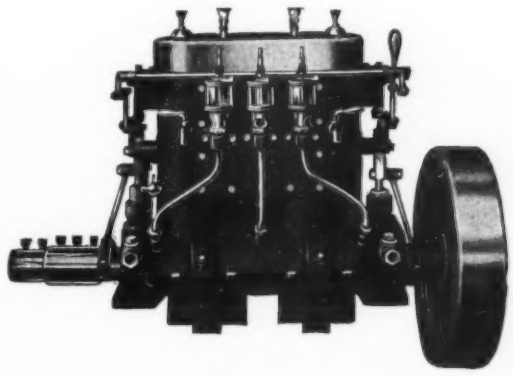
Never before has a finer collection of the boat-builder's skill been prepared than will be exhibited to the boating public in the shows of 1909. The following pages give a splendid idea of the variety and interest of the Boston show. In fact the show will be even more complete than our description of it, for the reason that some manufacturers were unable to furnish us with definite details of their forthcoming exhibits before this issue of YACHTING went to press.

To the courtesy and co-operation of Mr. Chester I. Campbell, the general manager of the show, is due, in no small degree, our ability to foretell as completely as we have the exhibits of our many friends

A High-Grade Serviceable Engine The Stanley Company, of Boston, will occupy spaces 34-39, wherein they will place on exhibition the following engines: A 2½ horsepower single cylinder, a 5 horsepower single cylinder, a 7 horsepower single cylinder, a 5½ horsepower double cylinder, a 9 horsepower double cylinder, and a 15 horsepower double cylinder. In a general way, these motors may be described as follows:

The Stanley motors are designed for high-grade, serviceable engines under any conditions, and great care has been taken to have all of the bearings and working parts of ample strength and size to insure long life and continuous service. They are all fitted with the well-known and tried make-and-break method of ignition. The spark plug, ignition shaft, and all the other parts of the sparking device can be adjusted and removed without taking off the cylinder head, or disturbing the position or adjustment of any other part. The engine will reverse and run in either direction.

The cylinder is water-jacketed on both sides and also around the head. Special provision is made for the cooling water to run out through the exhaust pipe to keep that pipe cool, and the cost of extra pipe and labor for this purpose is thus avoided. The water circulation is produced by a plunger type of pump. The motors are fitted with a float-feed carburetor of well-known design. The oiling of the piston is by means of an annular groove, cut on the piston near its lower end, and a vertical groove that has been milled to connect with it. This groove is connected by a pipe to the oil cup. Oiling of the crank shaft is done by oil or grease cups, placed on each side of the motor, and also by an oil cup placed on the handhole cover to the crank-shaft chamber, to which is connected a wiper that puts oil on to the crank-shaft bearing at every revolution of the shaft, preventing it from running dry. The crank shaft and counterweight, when used, is one piece of steel and is made from a forging of specially treated nickel alloy steel. It is machined and ground perfectly true, with the result that the shaft has great strength, toughness and accuracy.

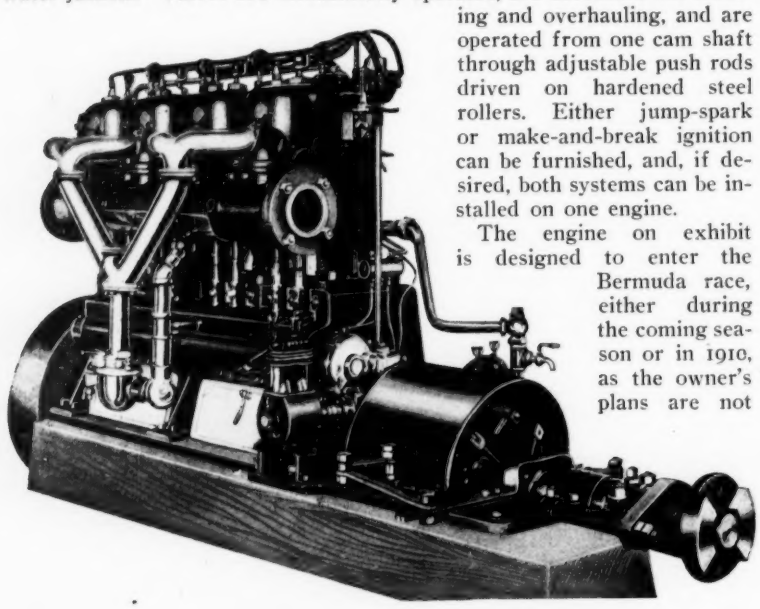


A 2-cylinder, 2-cycle Stanley Engine, developing 9 H. P. at 450 revolutions per minute.

Ideals which are Proof Against Shattering In space No. 47 will appear the exhibit of the Ideal Marine Engine Manufacturer, by V. J. Emery, of Wollaston, Mass. This exhibit will consist of a 4-horsepower, 2-cylinder; 8-horsepower, 2-cylinder; 12-horsepower, 3-cylinder, and one each of the 16, 25 and 40-horsepower, 4-cylinder type.

No radical changes in style or mechanical arrangements of parts have been made in these engines since last season, but one or two slight improvements in detail have been added, which will increase the popularity of these motors.

A Future Candidate for Bermuda Honors In space No. 17 will be found the exhibit of Charles J. Jäger Company, 281 Franklin Street, Boston. They will show one of their four-cylinder heavy duty, slow-speed engines, rated at 32 hp. at 350 revolutions per minute, with cylinders 6⅜-inch bore by 8-inch stroke. The design and construction of this engine follow the lines of the medium speed, medium weight Jäger engines that have proved so successful in general service, the distinctive features being the elimination of water-packed joints on the cylinder castings, as the valve chests and cylinder heads are cast with the water-jackets. Valves are mechanically operated, are accessible for cleaning and overhauling, and are operated from one cam shaft through adjustable push rods driven on hardened steel rollers. Either jump-spark or make-and-break ignition can be furnished, and, if desired, both systems can be installed on one engine.



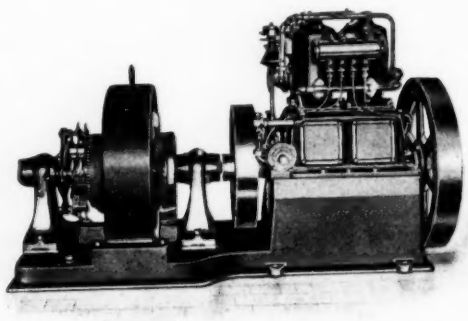
Four-Cylinder, Heavy-Duty Jäger Engine which will be entered in Bermuda Race of 1909 or 1910. It develops 32 H. P. at 350 revolutions per minute.

The engine on exhibit is designed to enter the Bermuda race, either during the coming season or in 1910, as the owner's plans are not at the present time definitely formulated for the coming season.

Particular attention has been paid in the design of this engine to the development of maximum support of the working strains, with very large bearing areas on crank shaft bearings, and at the same time valve areas have been worked out to develop, for a heavy-duty engine, a very high speed range.

Particular attention has been paid to the weights of the reciprocating parts, so as to allow the engine to be operated at higher speeds than 350 revolutions per minute, if desired, and at the same time be within safe working limits for reciprocating strains.

There will also be shown a four-cylinder, medium weight, medium speed Jäger engine, fitted with the new pattern make-and-break igniter, especially designed for flexible control from the bridge or bulkhead, and having ignition points which may be readily adjusted and easily renewed.



A Jäger Direct-Connected Electric Generating Set, with two-cylinder 10-H. P. engine.

One of the Jäger direct-connected electric generating sets in the two-cylinder 10-hp. type will also be shown. These outfits are coming into extensive use, and have won favorable comment, because of their satisfactory performance under conditions calling for continuous operation. The steadiness of the light and the unusually good regulation have created an excellent impression upon the trade, and a recent order for four 25-hp. sets from one customer indicates an established confidence in them.

It is also expected that they will show a two-cylinder, 10-horsepower, medium weight, medium speed engine, as well as a 7-horsepower, two-cylinder, light weight high-speed yacht tender engine, known as type G.

In connection with this exhibit there will be shown a fine mahogany runabout, equipped with Jäger high-duty, light weight engine, with bulkhead controls and all of the latest improvements in runabout construction. This boat is being built by Messrs. Stearns & McKay, of Marblehead, for Mr. Spencer Ilsley, of Tomahawk, Wis., and will be a notable addition to the boats at the show.

A Dory for Rough-Water Use. An Interesting Line of Motors and Accessories The Toppan Boat Manufacturing Company, Boston, Mass., have secured at the Boston show spaces 32 and 33. Their special exhibit will be a new 18-foot, rough-water type of launch, which is the latest product of the Toppan concern. This 18-foot launch will have 5 feet 5 inches beam, and will be equipped with a 3-horsepower Toppan engine. It is a roomy boat for its size, besides being very stiff. It has a wide, flat keel with full bow to get the same buoyancy for seaworthiness as the Toppan dories. These launches are made in sizes from 16 to 30 feet and are proving very popular, as they are attractive-looking boats. They will also exhibit one of their standard 18-foot power dories, equipped with 2-horsepower Toppan reversible engine.

Another of their boats to be shown is a 26-foot trunk-cabin cruiser of the dory type, of which many are already in use and giving the best of results. This boat will have a long deck forward, with the trunk raised with extra crown, giving much more cabin room than one could possibly imagine in a boat of this size. She is equipped with a 2-cylinder 8-horsepower Toppan reversible engine. This boat is made with 6½ feet of beam, is smooth planked, has canvas decks and polished brass fittings.

The Toppan Motor Company will also exhibit a full line of their new 1909 Toppan engines in the following sizes: 2-horsepower, 3-horsepower, 5-horsepower single-cylinder; 8-horsepower and 12-horsepower double-cylinder, and 18-horsepower 3-cylinder. These engines are all of the 2-cycle type, and have many valuable and original features. One of the main improvements is that of the supply; this is taken in such a way that it strikes the cylinder walls and the crank case heated, which prevents condensation in the base. On account of this special feature this engine can be run equally well on alcohol or kerosene, though with the latter it will have to be started on gasolene. The engines also have raised commutators. This engine is made with solid top, and is one of the easiest engines to assemble that is made. The parts are also very accessible.

Another good feature is the positive reversing ability of these engines. Being of the two-port type they are very easy to start by a rock or two of the fly-wheel; in fact no starting handle of any kind is required on the Toppan motors. This company also produces two special outfits, which belong to the marine-engine line,—a twelve-light, 16-candle-power electric lighting outfit, and a direct-connected pump. Both are designed for use in summer cottages and are very compact. These engines will be exhibited in space No. 42.

A Toppan Dory, combining seaworthy qualities with roominess.

A Great Improvement in Spark-Coil Manufacture In space No. 56 W. J. Forbes will show the "Tuttle" 2-cycle motor, "Monarch" 4-cycle gasolene and kerosene motors, and the "K-W" Magneto, made by the K-W Ignition Company, of Cleveland, Ohio, who are manufacturing spark coils under an entirely new and anhydrous process.

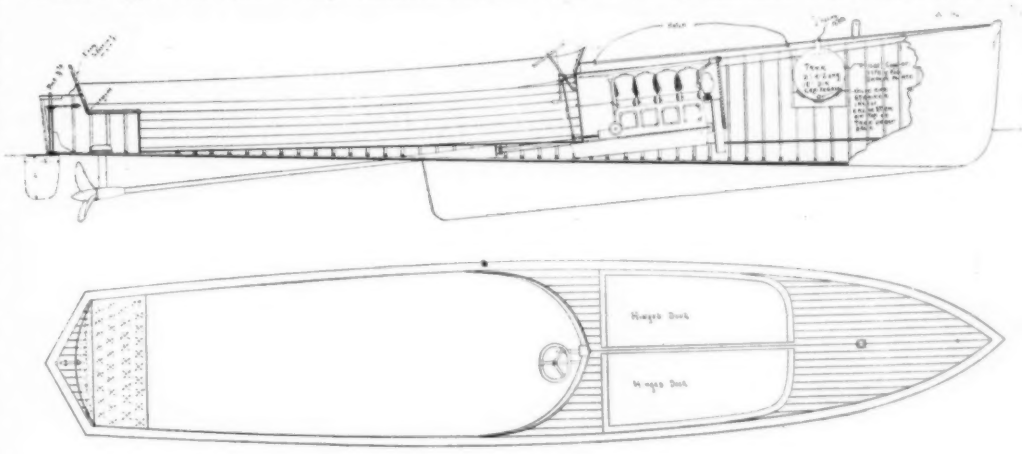
They have in use a vacuum impregnating system, which thoroughly dries out all of the moisture that is contained in the paper and silk insulation of the winding in a hot, high vacuum, and while the coil windings are still in the vacuum, a valve is opened communicating with another tank, which allows the vacuum to draw in and entirely immerse the windings of the coils with a molten dielectric of very high insulating quality. When the windings are thoroughly covered with this liquid, they then put an air pressure of 125 pounds to the square inch in the tanks with the windings, which forces this hot dielectric into every interstice of the insulation and into all of the pores of the paper, thus effectually sealing up the winding against the entrance of any moisture.

The K-W Ignition Company claim that the average 4-cylinder coil contains about one tablespoon of water in the windings. This water remaining in the coil in the form of moisture, absorbs four-fifths of the energy of the spark, and is the cause of its failing to produce any heat value as an ignition spark, whereas the same coil after passing through the above-mentioned treatment, making it an anhydrous coil, will develop from five to six times as much heat in the spark.

The ordinary method of manufacturing spark coils and the one which we believe to be in most general use is to simply boil the secondary windings in a vat of parraffin wax. This simple boiling, however, cannot remove the moisture from the coil, as it requires a high vacuum, as well as heat, to remove the moisture, which comes off in the form of vapor.

The K-W Ignition Company have installed a very thorough and elaborate plant for the manufacture of spark coils. They do their own winding by means of automatic winding machines of their own manufacture, and, we understand, use the very highest grade of material in the construction of their product. This company was the first to produce this anhydrous process of spark-coil manufacture, and the first to place on the market an alternating current magneto without any moving wires or brushes. They were also the first concern to put on the market a synchronizer or master vibrator. This new method of coil-building thus constitutes their third step in the advancement of the art of ignition.

A 20-Mile Runabout that Will Stand Rough Usage Space No. 16, near the main entrance, has been secured by the Marblehead Yacht Yards —Stearns & McKay—and in it will be shown a 29-foot boat of the popular runabout type. The boat is very conservative in design, and is equipped with a Jäger 25-hp., four-cylinder, four-cycle engine. The controls are very conveniently arranged on a dashboard at the forward end of the cockpit, which leaves the latter entirely clear and free from machinery, and keeps out the noise, heat and smell of the motors. The machinery is so out of the way as to be no more noticeable than it is when riding in the tonneau of a motor car. The forward deck is entirely flush, but two sections over the motor are arranged to hinge so that one may easily reach all parts of the engine. The joints of this hatch are made tight, and what little water comes through is carried off by gutters cut in the ledge which supports the hatch. These gutters drain outboard, and will effectively prevent any moisture from reaching the engine.



A 29-foot Stearns Runabout, in which the steering gear and engine control are very conveniently located.

The boat is heavily constructed to stand rough usage. and while, with the slow-speed motor, very high speed cannot be obtained, 20 miles per hour may be counted on. The launch is built entirely of mahogany and has very handsomely turned lines.

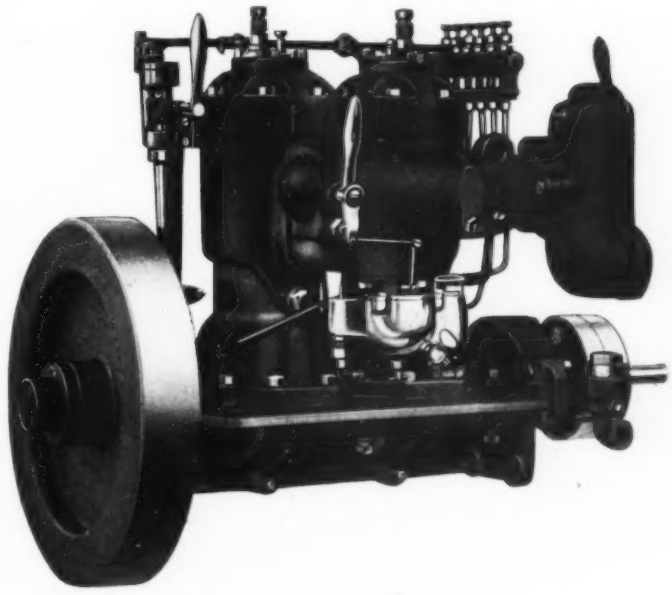
Stearns & McKay will also make a feature of their anti-fouling bottom paints, in white and green. These paints have already been used on many of the finest yachts in these waters, and are rapidly obtaining for themselves a golden opinion all over the country.

A New Addition to an Old Line The Ferro Machine & Foundry Company, Cleveland, Ohio, have this year brought out a new 3-horsepower motor, which they will call the Ferro Special. They will, during 1909, make a leader of this engine and advertise it at a popular price, without ignition or propeller equipment, so that a purchaser may obtain his engine at a very moderate cost and equip it as suits the particular and special use to which he will put it. This engine is built with the same careful workmanship, and of the same material throughout, as the regular Ferro motors, and will, undoubtedly, be heard from quite favorably during the coming year. The Ferro Special is made in the 3-horsepower size only and guaranteed to develop its full rated horsepower. It has the same 1909 Ferro carburetor and the offset crankshaft as have the regular 1909 Ferro line of motors. One of its practical features is the ease by which it can be taken down without removing from the engine bed. Moreover, no matter at what angle the engine is installed, the carburetor can be swung to any position in order that the float may be set level.

In addition to this special motor, the Ferro Machine & Foundry Company will also have on exhibition in space No. 52, through their district representatives, the Angier Company, a full line of the regular Ferro models, consisting of single-cylinder motors in 4, 5½ and 7½ horsepower, double cylinders in 8, 11 and 15 horsepower, and triple cylinders in 12, 17 and 25 horsepower, with the jump-spark ignition system; also a single cylinder in 4, 5½ and 7½ horsepower, and double cylinders in 8, 11 and 15, with make-and-break ignition.

Among the improvements to the Ferro motors for the coming season is the enlargement of the bores of all their cylinders, which have been increased by ¼ inch. Crank shafts are all balanced. Bearings are adjustable or interchangeable, and any repair parts can be ordered from the factory and replaced in little time and with little trouble by reference to the Ferro repair parts price-list booklet.

A particularly taking feature of the Ferro motors is their accessibility. There is a large handhole in the crank case of the motor, and the cylinder heads are separate and can be taken off, thereby allowing the removal of the pistons and connecting rods without disturbing the motors. The engine base is cast solid, and so constructed as to have the Ferro gear directly connected to the base of the engine, making it practically an integral part of the base. The Ferro Company are this year making a reverse-gear starting device that is very ingenious, complete and extremely handy for the operator.



A 2-cylinder, 11-H. P. Ferro Engine, with make-and-break ignition.

An Engine which Delivers the Power, and a Little More In space No. 51 the Essex Engine Company, of Lynn, Mass., will have on exhibition a line of the Essex 2-cycle marine engine in both the Essex Standard type and in the Essex special models.

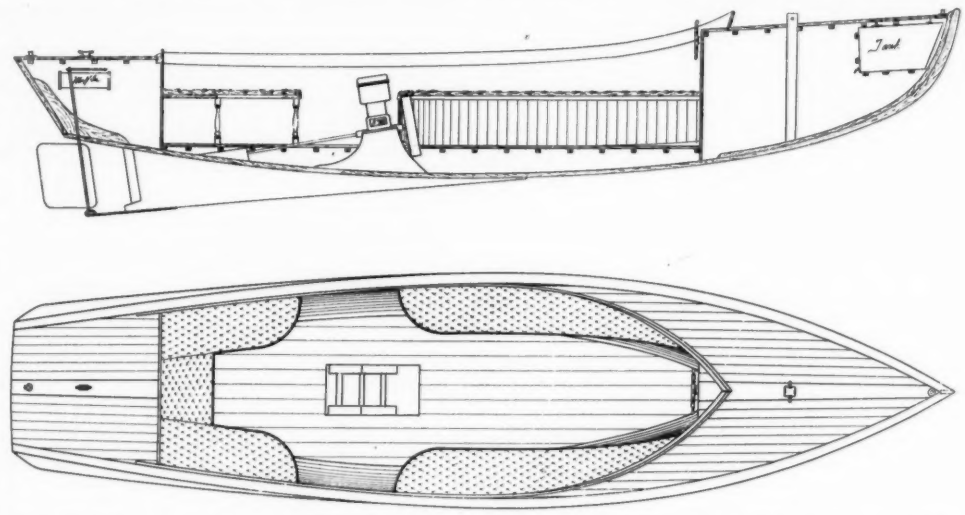
The former is a heavy-weight motor adapted for the heavier class of launches, fishing and working boats, and is built by the company in sizes ranging from 2½ to 25 horsepower. While this type is fairly heavy, it is not over-weighted, the metal being properly distributed so as to give the greatest strength to those parts subjected to the greatest wear and strain. Crank shafts and connecting rods are heavy, and the bearings extra long, giving both reliability and durability, and enabling them to successfully cope with the hard work aboard heavy launches, auxiliaries, fishing and commercial boats. The single-cylinder Essex Standard engine is built in three sizes of 2½, 4 and 5 horsepower and is designed to turn up at a moderate rate of speed, and is equipped with make-and-break or a snap-spark ignition. Spark can be instantly advanced or retarded while engine is running. The Essex Standard multiple cylinder engines are built in 2, 3 and 4 cylinders, with cylinders assembled on one base, separated by a distance just sufficient to allow a suitable crankshaft bearing.

The multiple cylinder Essex Standards are equipped with a new igniter. The igniter trips of all cylinders are arranged on one shaft and driven by a second small shaft extending down to the crankshaft. The advancing or retarding of spark on all cylinders is effected simultaneously by a slight movement of the advance lever, which is conveniently situated in front of forward cylinder.

The Essex Special engines are of light weight, high speed, and in their construction retain all the essential features of the Essex Standard type. On these engines the jump-spark system of ignition is used, and their design, finish and workmanship throughout render them particularly desirable for use in light pleasure launches, tenders and speed boats, where they give the same excellent service that the Essex Standard does in the heavier built cruising hulls.

A Camden Anchor-Rockland 19-foot Yawl Dory under way.

Something Good in Dories and Engines A 19-foot yawl dory will be one of the exhibits in space No. 4, occupied by the Camden Anchor-Rockland Machine Company, of Camden, Me. The dimensions of this craft will be as follows: 16 feet 5 inches on the water-line, 19 feet over all and 5 feet greatest beam. Her power will consist of a 2½-hp. Knox gasolene engine, which, running at 600 revolutions per minute, will, it is said, give a speed of 8 miles per hour. Her broad stern is a departure from the conventional dory type, and will give her lifting power in a following sea, besides enabling her to carry a considerable load aft of the engine.



Plans of 19-foot Yawl Dory. She is 16 feet 5 inches w. l., 5 feet beam, and makes 8 miles per hour with a 2½-H. P. Knox engine.

A line of Knox gasolene engines, manufactured by this company, will also be shown, consisting of three-port, single-cylinder motors in 2½, 3½ and 4½ hp.; three-port, two-cylinder motors in 5 and 7 hp., and also a four-cycle, heavy-duty Knox motor of 20 hp. of the twin-cylinder type. In addition to these there will be shown Knox carburetors and towing and speed wheels.

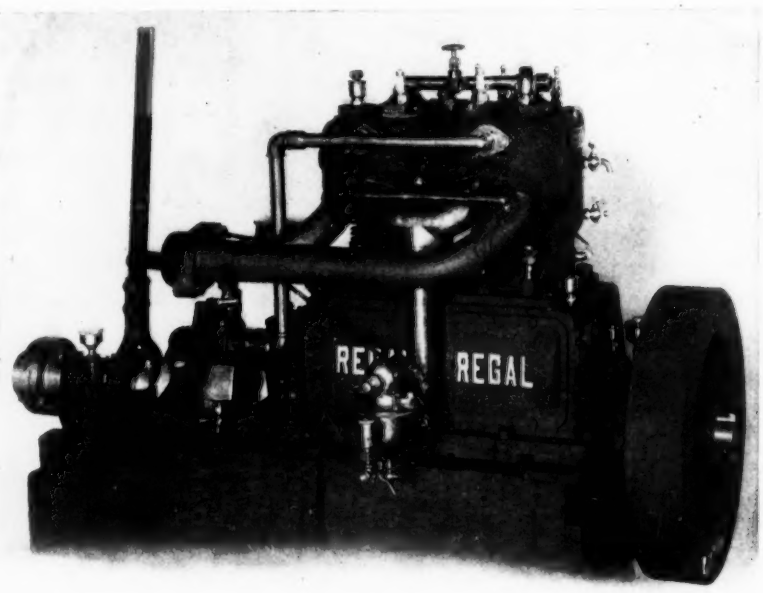
The 1909 Knox engines have increased crank-chamber compression and larger inlet and outlet ports as compared with the 1908 models. This, the manufacturers figure, will give them in the neighborhood of 30 per cent more speed, although the engine still retains its former rating. A change has also been made in the circuit breakers, which last year worked jointly with a pump. On the 1909 model they are operated by means of an independent eccentric strap on the crankshaft. The igniters are now air cooled, and the exhaust is water cooled.

A Good Showing of Engines W. H. Broadhead Company, of Charlestown, Mass., will exhibit in space No. 10 a complete line of the De Mooy two-cycle engines, for which they are the New England agents. The exhibit will consist of a 4-hp. single-cylinder, an 8-hp. single-cylinder, an 8-hp. two-cylinder, a 16-hp. two-cylinder, a 20-hp. two-cylinder, a 24-hp. three-cylinder and a 30-hp. three-cylinder.

One of the stars of the exhibit will be the 16-hp. double-cylinder, known as the De Mooy No. 7 Special, which develops 16 hp. at 800 revolutions per minute. This engine is equipped with an auxiliary air valve whi the makers claim, serves to reduce greatly the amount of gasolene used. The engine can be throttled with either valve or igniter, and the cylinders are so arranged that they may be removed without interfering with crank shaft or bearings. This engine has a cylinder bore of 4¾ inches, a 5-inch stroke, and weighs 360 pounds. While developing 16 hp. at 800 revolutions per minute it will, the manufacturers claim, develop 12 hp. at 600 revolutions per minute.

To the man looking for power for a moderate-sized open boat, the No. 5 Special De Mooy, developing 6 hp. at 600 revolutions per minute to 8 hp. at 900 revolutions per minute, will appeal. This is a double-cylinder engine, weighing 192 pounds, and is suitable for a boat of from 16 to 28 feet over-all length. In a properly designed craft of these dimensions it will produce a speed of from 7 to 10 miles per hour. It is particularly desirable for use in yacht tenders, in which case it should be equipped with a 15½-inch three-blade towing wheel.

In addition to the above entries, the Broadhead Company also exhibit a 4-hp. Bunker Hill single-cylinder and an 8-hp. Bunker Hill two-cylinder engine.



8-H. P., 2-cylinder, 4-cycle Regal Engine. Note extended base and reverse gear.

A Coil, Timer and Distributor in One In space No. 70 the American Electric Fuse Company, of Muskegon, Mich., will display a full-sized model, 4-cylinder, gasolene engine, on which will be installed one of their American igniters.

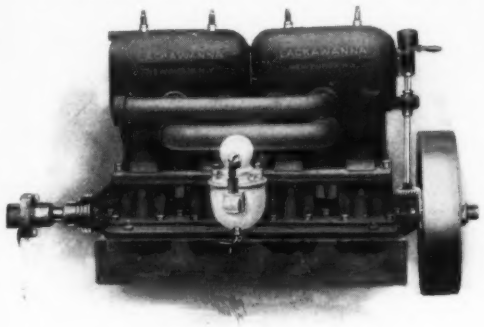
The engine cylinder will be cut away to afford a view of the business end of the spark plug, and also show the effect on the timing of the spark with reference to the piston travel, of advancing and retarding the igniter. The American igniter is a coil, a timer and distributor contained in one case, and mounted directly on the timer shaft of the engine. The case is proof against heat, dust and moisture.

The coil is non-vibrating and wound to very high efficiency, thereby producing an intensely hot spark. As the high-tension cables are connected directly to the ig-

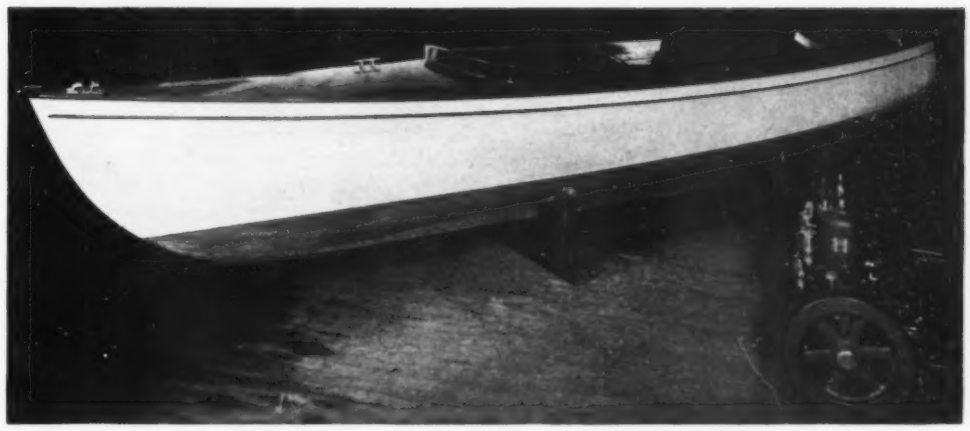
niter, only the two low-tension wires connecting igniter and batteries are carried where they may be touched or handled, and as there is little or no likelihood of the low-tension wires being short circuited, the merits of the system are easily appreciated.

A Manchester Yacht Club One-Design Raceabout, a 21-Foot Runabout and Engines for the Cruiser and Fisherman

Among the prominent exhibitors will be Arthur P. Homer, who has secured spaces Nos. 28, 29, 30, 43, 44 and 45. In spaces 44 and 45 will be seen the exhibit of the Rice Bros. Company, consisting of a 21-foot runabout, equipped with one of their own



A 4-cylinder, 2-cycle, 24-H. P. Lackawanna Engine.



Rice Bros. Co. 21-foot Runabout. She is equipped with a 2-cylinder Rice engine, and will make 10½ measured miles per hour.

engines. This little boat differs from the ordinary small runabout in that its designer has aimed at a fair turn of speed, with a construction sufficiently heavy to be serviceable, and a model that will be seaworthy in any weather.

Her keel, stem, sternpost, frame, stringers, coaming, sheer strake, bulkheads, king plank and plank sheer are of white oak. The planking is of clear white cedar, fastened with copper rivets. The outside is finished bright, with three coats spar varnish. Decks, coamings and inside are finished bright in the natural wood. All her deck fittings are of polished brass. She has an auto steering wheel on the after bulkhead of the engine space, with spark and throttle control near it. The engine has a bulkhead starting device, so it will be seen that she is easily controlled and handled by one man. Her power consists of a double-cylinder, 6-hp. two-cycle Rice engine, which gives her a speed of 10½ miles between buoys. Her seating arrangement is a particularly attractive one, and will appeal strongly to the comfort-loving prospective boat-owner. Another feature which will cause favorable comment by those with a knowledge of boats is her specially designed skeg, which gives absolute protection to both shaft and wheel, and at the same time allows a free flow of water to the propeller blades. Both skeg and rudder are of Tobin bronze, and all her fittings are designed for salt water use.

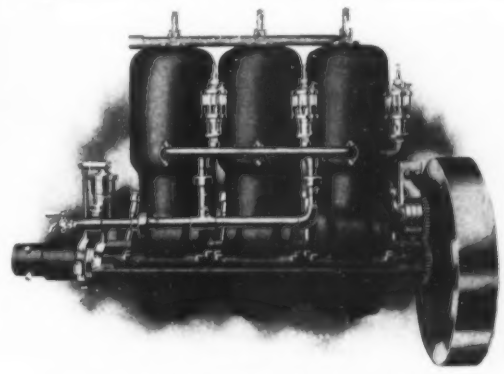
Manchester Yacht Club One-Design Class Raceabout, designed by Crowenshield and built by Rice Bros. Company.

In the space adjoining the gasolene runabout will be one of the Manchester Yacht Club's one-design class raceabouts, designed by Crowninshield, and also built by Rice Bros., which we have illustrated and described in the section of this issue devoted to plans.

In space 43 will be seen the well-known Sterling engines, including a complete line of two and four-cycle motors. These engines are making great strides in popularity on the Atlantic coast.

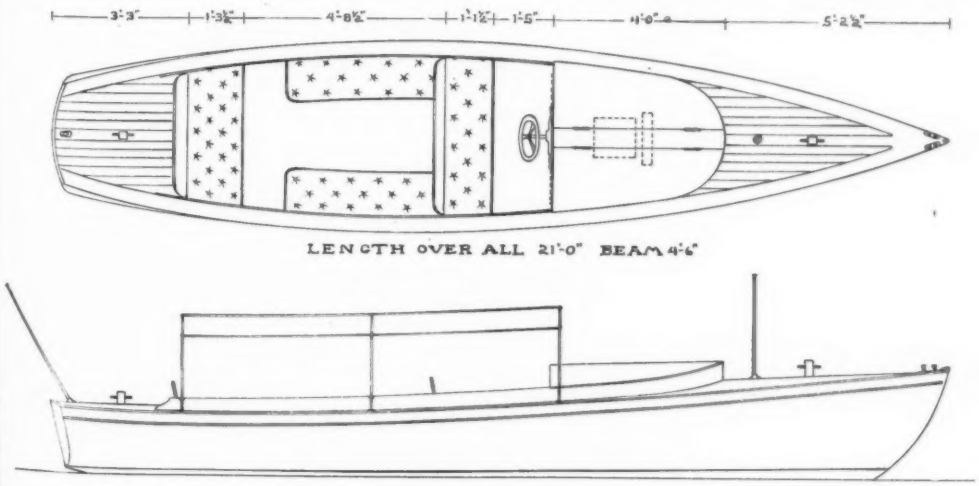
In space 28 there will be an exhibit of Waterman motors of the two-cycle type stationary motors, electric lighting outfits and pumping engines and the Waterman Outboard motor, by which an ordinary rowboat may be converted into a power boat in five minutes. This company also shows a new 3½-hp. motor, weighing 60 pounds, which, as tests have shown, will give at normal speed over its rated power. All of the Waterman motors are equipped with Schebler carburetors, and show careful thought in both design and construction.

The Lackawanna valveless motor will be found in space 29. This is one of the old reliable motors which this year shows great improvement. The high quality of workmanship has been maintained and many little improvements, which go to make a high-grade motor, have been added, while the simplicity for which it has always been noted has been retained. It is the claim of the Lackawanna Manufacturing Company that they have been continuously improving their engines in those vital parts—the piston, ports and cylinder—and that by attention to these details they have produced a motor with practically no vibration. Other important considerations—carburetion, oiling, water circulation—have also been studied with a view to simplification and positiveness, in order not to complicate the practical usefulness of the engine itself. It is the maker's boast that these vitally important parts, as well as ignition, speed control and ease in starting, will be found worked out along positive, durable and modern methods, but with such simplicity that any novice can readily understand the operation of the motor.



Kennebec 3-cylinder, 2-cycle jump-spark engine, developing 15 H. P. at 500 r. p. m.

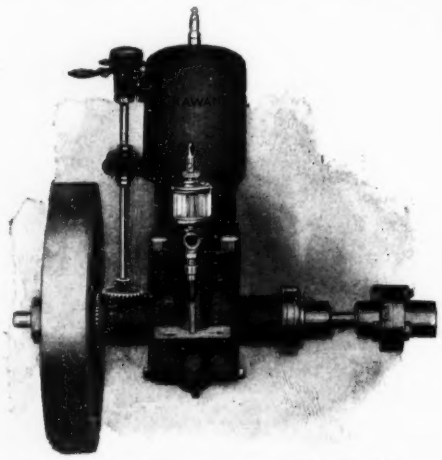
The illustrations herewith show a direct-driven, valveless pump without noisy eccentrics, a pipeless



Plans of 21-foot Runabout, showing a very comfortable seating arrangement.

water connection, straight into the jacket, whence, after cooling the cylinder, it flows overboard by way of the silencer. There are no sharp bends or long pipes in the oiling system. The one reservoir for the several cylinders is placed high, is easy to regulate, and has sight feeds distributing by short, large-diameter tubes.

The Lackawanna exhibit will consist of a 2-hp., single-cylinder motor, a 4-hp. single, a 4-hp. double, an 8-hp. double, a 12-hp. double, a 15-hp. double, a 21-hp. three-cylinder, a 27-hp. four-cylinder, and a 30-hp. four-cylinder engine. Specimens of the Hydrex Silencer are also shown, as improved by the inventor, Francis G. Hall, the well-known gasolene engine expert and sales manager of the Lackawanna Manufacturing Company.



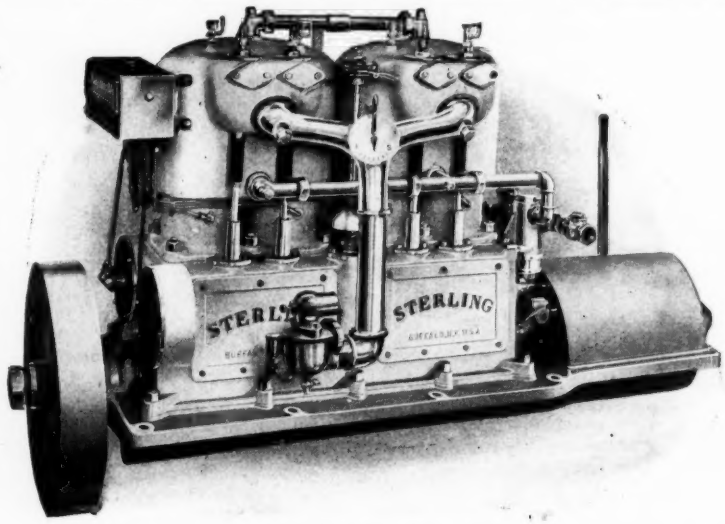
Lackawanna 2-cycle, 2-H. P. single-cylinder engine.

The Hydrex Silencer insures quiet, cool, low-pressure exhaust, and differs from the ordinary devices for this purpose insomuch as it is neither an iron box filled with baffle plates, tubes or perforations, nor a plain cylindrical chamber, but is designed on a new principle by which the makers claim that back pressure is eliminated and a suction obtained, which aids in insuring a clean charge in the engine cylinder after each exhaust, it being especially effective in engines of two or more cylinders.

The Hydrex Silencer is so arranged that the pilot valve, when open,—*i. e.*, with lever vertical,—accomplishes three things: 1. It gives free exhaust direct to the atmosphere, eliminating back pressure in starting engine. 2. It establishes correct installation of exhaust piping, whether ordinary or sub-surface. 3. It prevents moisture or water from clogging exhaust.

Hydrex Silencer piped directly overboard.

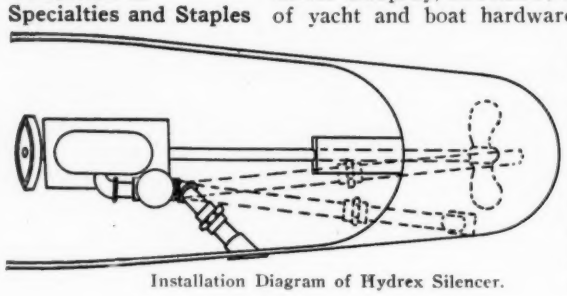
In space 30 will be found a motor which has "made good" with the fisherman of the Maine coast. This is the "Kennebec," built by the Torrey Roller Bushing Company, of Bath, Me. These motors are designed and built by salt-water men for heavy service, and one of the motors shown will be a five-year-old Kennebec on which the owner has never expended a cent in repairs. These engines are for heavy, hard work, and of particular interest to the fishermen of the district. The Kennebec motors are of the two-cycle, two-port type, and are designed for the heavier class of boats, although the small multiple-cylinder engine gives surprising results in a light swell. These motors have been built for the past five years by the Torry Roller Bushing Company, of Bath, Me., and the entire product has been taken by the fishermen of the Maine coast and people of the locality who were willing to pay Kennebec prices for a good, high-grade machine. These engines are furnished with either make-and-break or jump-spark ignition, as desired by purchaser. Their make-and-break ignition is a very simple device without plugs, and is practically indestructible and very efficient. Throughout, these engines show the careful design and workmanship that insure long life under severe conditions.



A 40-H. P., 4-cylinder, 4-cycle heavy-duty Sterling Engine.

A Most Interesting Collection of Specialties and Staples

Spaces 50-60 will be occupied by the A. S. Morss Company, of Boston, with a complete line of yacht and boat hardware and supplies, including many novelties, which they control exclusively.



Installation Diagram of Hydrex Silencer.

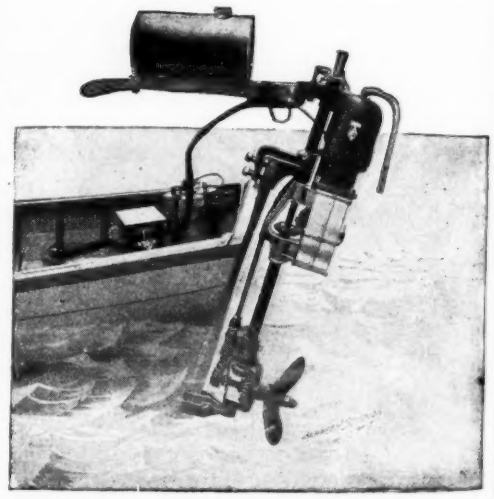
This company has been in the marine hardware business for over sixty years. Its line is, as might be expected, about as complete as possible, and in its store may be found everything entering into the construction and equipment of a boat, from tacks to windlass.

That the activities of this firm have not diminished with age, but rather have tremendously increased, is apparent to anyone paying them a visit. The extremely rapid development of motor boating has brought out a great many new requirements, but this firm has kept well to the front in anticipating these demands. Everything that a yachtsman or builder may require for building and equipping a yacht may be found here: fastenings, tools, deck hardware, cordage, engine fittings, plumbing supplies, propellers, electrical fittings and general equipment.

The A. S. Morss Company have the exclusive control of many patented specialties, among which are the Skene Chock, a clever modification of the old-fashioned open chock, which effectively eliminates all danger of the anchor rope or towline jumping out of the chock; the Worthen sail hoist; the Gill roller mast hoop; the Osborn racing cleat, devices which are extensively used on recent cruising and sailing yachts; and the Skene sectional boat. The latter is the only practical portable boat on the market, and meets a very decided want on the part of yachtsmen for a tender which may be taken aboard the yacht and stored away in a small space.

The Geyer reversing propeller, sold by this firm, is one of the neatest, simplest and most up-to-date reversing propellers on the market, and is made with two and three blades. The blades have a lip on them, which slides in a corresponding slot in the hub, which gives them the strength of a solid wheel. This wheel is made also with blades feathering fore and aft, for use on auxiliaries where the wheel must be dragged through the water when under sail.

The Morss Company makes a boat-builders' implement, which it calls the Morss jam planking clamp. This is a small casting of steel, which jams in place on the frame, making a backing for a wooden wedge, and enabling the builder to force one plank very tightly against another. These clamps are very inexpensive, so that a number may be used at the same time in putting a plank in place. The Morss waterproof battery set is one of the company's best selling novelties. It consists of a number of dry cells connected in a wooden box and flooded with a special insulating and waterproofing composition. This makes the battery absolutely waterproof, and all accidental short circuits and loss of power are avoided. Hundreds of these have been used the past few years, giving the very highest satisfaction, which is proved by the rapidly increasing sales. The waterproof spark coil is made in the same manner, and with equally good results.

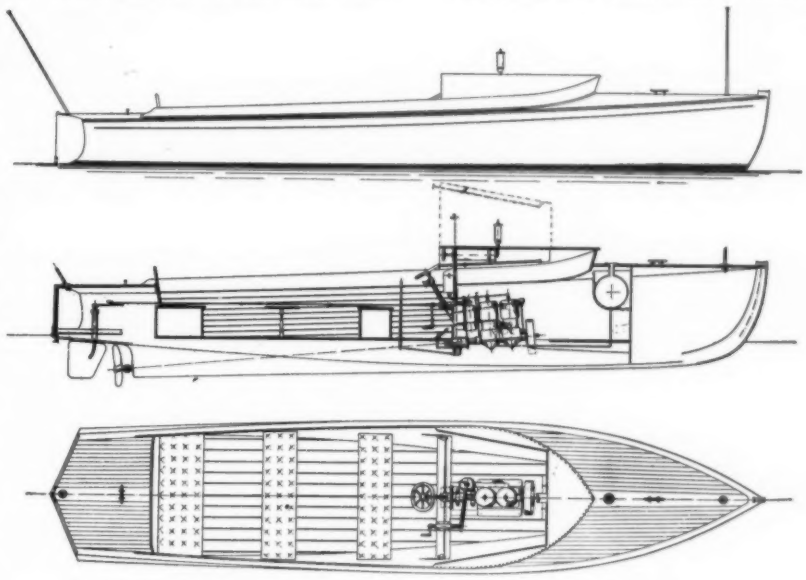


Waterman Outboard Motor and equipment attached to a rowboat.

Without doubt, the Morss space will prove a gathering place for the motor-boat clan who have under consideration the purchase of a new equipment or the refurbishing and bringing up to date that of last season.

A 21-foot Runabout from 'Way "Down East"

The accompanying plans show a 21-foot runabout, designed and built by the Bath Marine Construction Company, who will exhibit her in space No. 36. She represents a type of which the company is making quite a feature. The beam is 4 feet 6 inches. These boats are moderate in price, well built, speedy, comfortable and very good sea boats for their class. There is a metal cover, which hinges over the motor, forward, and this gives easy access to the engine. The cover can be hinged up and fastened, so that the motor can be kept in full view of the operator if so desired. The boat is controlled from a bulkhead just aft of the motor with throttles, reverse gear, etc., so that the steersman has everything within reach, and it is unnecessary to enter the motor compartment to control the machine. These boats, equipped with a 2-cylinder, 12-horsepower motor, are capable of about 15 miles an hour.

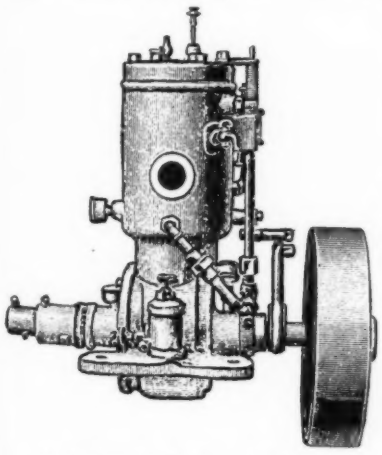


A 21-foot, 15-mile Runabout, shown by Bath Marine Construction Company.

There are three 'thwart seats of mahogany, the forward and after ones containing lockers. A low operating bulkhead of mahogany is placed just abaft of the engine, contains steering gear and the various controls, and a watertight bulkhead is placed forward of the engine compartment. A 3/16-inch bronze rudder, with bronze stock and galvanized tiller, is connected to the steering wheel by means of wire-cored cotton steering lines running through brass sheaves. The steering wheel is of the automobile type with mahogany rimmed wheel, brass standard and ratchet. The deck fittings consist of two flag-pole sockets, one forward and aft, for 1-inch flag poles; two 7-inch hollow cleats; one chock aft to fit the shape of the stern; one chock forward of the pipe type, brazed to the brass stem casting, which is made particularly sharp and extends back from the stem to cover the ends of planking, and is let in flush with the hull proper; one brass filling plug. All fittings are of polished brass. The engine is started by means of a crank, connected by ratchet sprocket wheels and chain to engine and conveniently located on the bulkhead.

The levers for controlling the gasolene and spark advance are led to the control levers, which will be attached to the stock of the steering wheel. The exhaust is carried down below the floor and out through the stern, no elbows being used, and all the turns made either with 45 degrees or by gradual bending of the pipe. The circulating water is piped into the exhaust. The hull is finished bright above the waterline with two coats of spar varnish, rubbed down between each coat; below the waterline the boat is painted green. All bright work is filled, shellaced, and receives two coats of good spar varnish.

A Valveless, Reversible, Heavy-Duty Engine; a Compact, Light-Weight, High-Speed Engine and Some Attractive Propellers



A single-cylinder, valveless, reversible "Bull Pup."

The Consolidated Carpet Sewing Machine Company, of Bridgeport, Conn., will occupy space No. 92A, wherein they will exhibit two Fairfield engines—better known as "Bull Pup"—of 2 and 4½ horsepower, and also 1, 2, 3 and 4-cylinder Park City auto-marine engines of 2, 4, 6 and 8 horsepower. They will also make a very attractive showing of their two and three-blade bronze propellers.

The "Bull Pup" engines, which are intended for heavy duty, are heavier in construction than the Park City type, and much attention has been paid to durability and strength in construction. One of its special features is that it is absolutely without valves, and is also reversible, inasmuch as it can be run in either direction. The reverse motion is obtained by the use of their Climax lead changer without stopping the engine.

The bearings are all reamed to standard size, scraped and lapped. Crankshafts are drop-forged, and protected keys are used. The pistons are of the trunk type, fitted with lapped rings and guaranteed to hold compression. Connecting rods are hollow, and of the very best bronze, and are fed with non-fluid grease, which gives a perfect crank lubrication—a feature of construction which is claimed to be original with these manufacturers.

The ignition is simple and positive, giving the same spark at any speed. Cylinders, head and exhaust pipes are water-jacketed. Both oil cups and compression grease cups are used on these engines. The ease and safety of starting these motors is made a special feature by the builders, and they are furnished in both make-and-break and jump spark.

The Park City auto-marine engine is built very lightly and compactly; at the same time it is very strong. It is a high-speed engine running from 1,000 to 1,500 revolutions per minute, and is built in sizes from 2 to 24 horsepower, and in from 1 to 4-cylinder types.

An Engine for Hard, Every-day Service

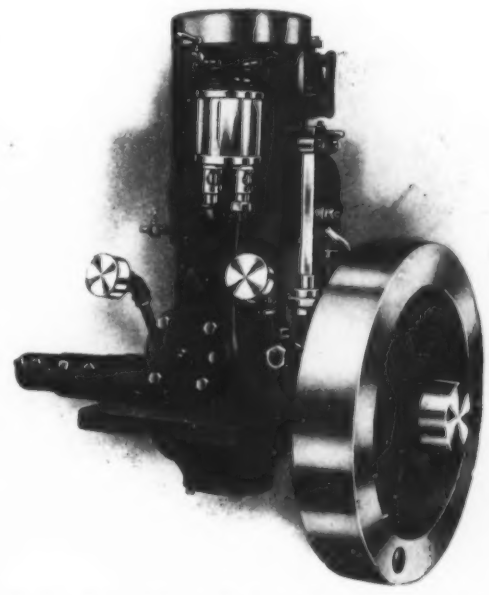
The Mianus Motor Works, of Mianus, Conn., will exhibit in space No. 37 a line of engines built by them.

The 1909 Mianus promises to be one of the marine gasolene engine sensations of the year. It will be made in 3, 5 and 7½-horsepower single-cylinder, and 6, 10 and 15-horsepower double-cylinder types. The design shows carefully thought-out plans, and the entire elimination of superfluous parts.

The motor is well balanced and handsomely finished and has make-and-break ignition. The igniter is contained in a bronze frame attached to the cylinder by two heavy machine screws. The frame is ground joint to cylinder, no packing being used, which always ensures a perfectly gas-tight connection. The working parts of the igniter are hardened nickel steel. The sparking points are a special long-lived alloy, irridium, which will not corrode or oxidize and will continue bright until worn out. The frame is quickly detachable from the cylinder for inspection, and the spark can be tested in full view of the operator. The time of the ignition can be controlled with a special lever for that purpose, being advanced or retarded at the will of the operator.

There is one important part of a marine gasolene motor that has to stand lots of hard "kicks," not from the operator, but from the explosions in the cylinder, and that is the crankshaft. The strain that is concentrated on the crankshaft at the time of the explosion in the cylinder is enormous. All Mianus motors have nickel steel crankshafts, which have great strength and durability.

The connecting rods are of .40 high carbon steel, bushed with phosphor bronze bushings. Particular attention is given to the casting and finishing of the cylinders, which are cast from fine close-grained iron, bored, reamed and ground to a mirror finish, true to the greatest degree of accuracy. The piston and rings are cast from the same material as the cylinders and are finished with automatic machinery and ground to a true circle.

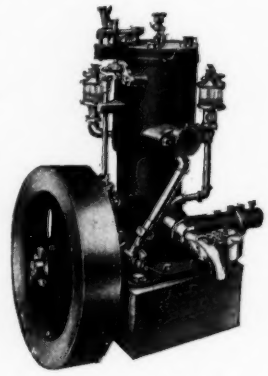


Single-cylinder Mianus Engine with make-and-break ignition.

Some Noteworthy Engines for Various Purposes

In spaces Nos. 208 and 209 will be shown a line of Fairbanks Marine Engine, consisting of the Victor, Fairbanks, Ralaco and Automatic, covering every possible requirement, except freakish light-weight, and offering a choice of power for all marine purposes.

The Victor, which will be exhibited in sizes from 1½ to 10-horsepower, inclusive, is of the 2-cycle, single-cylinder, heavy contruction type, and has make-and-break ignition. Some of its most attractive features are the extremely simple ignition mechanism, the larger plunger circulating pump and the exceedingly neat and trim appearance of the engine. A large number of Victors are in use in fishing boats, where absolute reliability is essential. The full line will be shown and is certain to attract favorable comment.



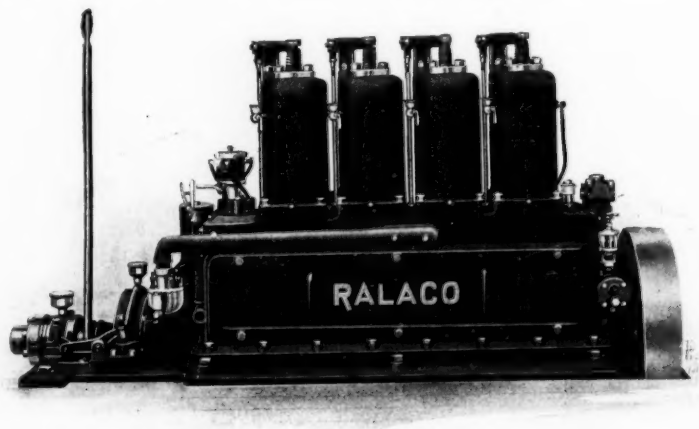
Single-cylinder, 2½-H. P. Royal 2-cycle engine.

The Fairbanks light-weight, 2-cycle, medium-speed engine in evidence is made in eight sizes, ranging from 3 to 25-horsepower in single, double and triple cylinders, with jump-spark ignition. The uniformly good results obtained with this type during 1908 have convinced the Fairbanks Company that the design could not be improved upon, and it therefore will be built without radical change for 1909, but with the addition of a few minor refinements. Closed head, force-feed oiling system, liberal bearing surfaces and extreme simplicity are the features responsible for its success in the past.

In the Ralaco, the Fairbanks Company offer what, in their opinion, is an engine of the highest possible quality—4-cycle, with intake, exhaust and water passages cast integral, leaving the engine clear of piping. The governor (which prevents racing when the clutch is thrown out, or in heavy seas), air pump, large plunger water pump and the highly efficient clutch are features worthy of commendation. The valves are in cages, which are interchangeable. Both intake and exhaust valves are operated by a single rod and lever, which contribute to simplicity and quiet operation. A complete whistle outfit is part of the regular equipment of all sizes.

In point of economy, it is claimed that the Ralaco occupies a position in the front rank. Altogether, its elegant design, workmanship and finish should make this a most desirable engine. It is built in 10, 15 and 25-horsepower 2-cylinder, and 20, 30 and 50-horsepower 4-cylinder. The 25 and 50-horsepower have make-and-break ignition, and the 10, 15, 20 and 30-horsepower are equipped with jump spark.

The Automatic 4-cycle, slow-speed, heavy-duty engine has been well known for several years and is what may be described as a unit engine,—that is, each cylinder is practically an individual engine and has its own valve mechanism independent of the others. The make-and-break igniter is simple, reliable, and all the cylinders are controlled by a single lever. The reverse gears are of generous proportions and are calculated to withstand the shocks which the working-boat engines are liable to receive.

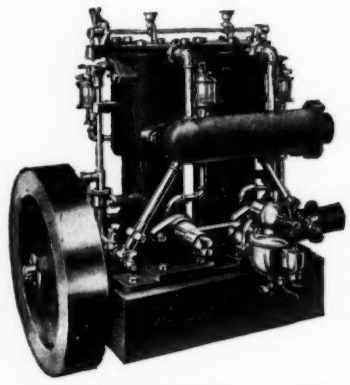


30-H. P., 4-cylinder, 4-cycle Ralaco Engine, the equipment of which includes a whistle outfit.

One of the Fairbanks Company's direct-connected electric generator sets will be used to light a large electric sign. This set presents an exceedingly attractive appearance and illustrates the progress this energetic company has made in the gas-engine business. The regulation of a gas or a gasolene engine, which has always been the stumbling block when utilized for direct-connected generator work, seems to have been overcome by the Fairbanks Company, as one could not ask for a more steady light than is furnished by this outfit. It is built in all sizes from eighty-five-light capacity up.

A Royal Group Which Will Receive During Show Week

The Royal Equipment Company, of Bridgeport, Conn., will exhibit at the Boston show in space No. 7 a complete line of the Royal Engines, of which we show herewith an illustration of the single and double-cylinder motor of the two-stroke type. They manufacture these engines in 2½, 5 and 7 horsepower single cylinder, and 5, 10 and 15 horsepower double cylinder, and their engines are so constructed as to be adaptable for a wide range of motor boats.



2-cylinder, 10-H. P. Royal 2-cycle engine.

The igniter is of the single-unit style, and of the make-and-break type. Both permanent and movable electrodes are contained in one plug, which is easily accessible for inspection by the removal of two cap screws. These igniters are extremely simple, and can be quickly adjusted without disturbing the electrical connections, or any part of the engine whatever.

This company has spared no time or expense in perfecting their motor, and to-day offer the public a most up-to-date and efficient engine. Much care has been given to design, simplicity of construction and the high quality of material used in the manufacture of the Royal Engine. The connecting rods are forged of thirty-point open-hearth steel, and carry phosphor bronze wrist-pin bearings, and a special bearing bronze for the crank pin. The crank-pin bearings are removable, and yet so constructed as to withstand the very severe wear and strain to which this part of the engine is subject. In the design and construction of this engine, the builders have eliminated all useless weight, thereby securing compactness, together with strength and power. They have also been very careful in the manufacture of the various parts, using jigs, fixtures and gauges wherever possible, so that every part of the engine is absolutely interchangeable. This is a very important feature and one that is appreciated by every up-to-date motor-boat owner.

The efficiency of an engine depends largely upon the manner in which the piston and rings are fitted. The Royal piston is built with four rings, three at the top and one at the bottom, and both the piston and the rings are carefully fitted in order to insure their being true and round. Another strong feature of these engines is the cam-spark control, which insures a perfect synchronization of ignition on the double-cylinder engines, and enables one to obtain an instantaneous control of the speed by moving a single lever.

The Royal Equipment Company have carefully arranged for, and equipped their engines with, a very complete system for supplying lubrication to all parts. One of the new features of their engines for 1909 is the addition of the ring oiler system, to lubricate the crank-pin bearing, and an independent sight-feed oil cup for this bearing and the cylinder.

A New Carburetor which Increases Engine Power at High Speed

The Watres Manufacturing Company, makers of the famous Watres whistle, are this year offering a carburetor that is so radically new as to be almost revolutionary. It is called the Duryea carburetor, and it differs from others in that it has a needle that automatically regulates the flow of gasolene to meet the varying speeds of the engine, so that at the very highest speed the engine is getting just as correct a mixture as at the lower number of revolutions.

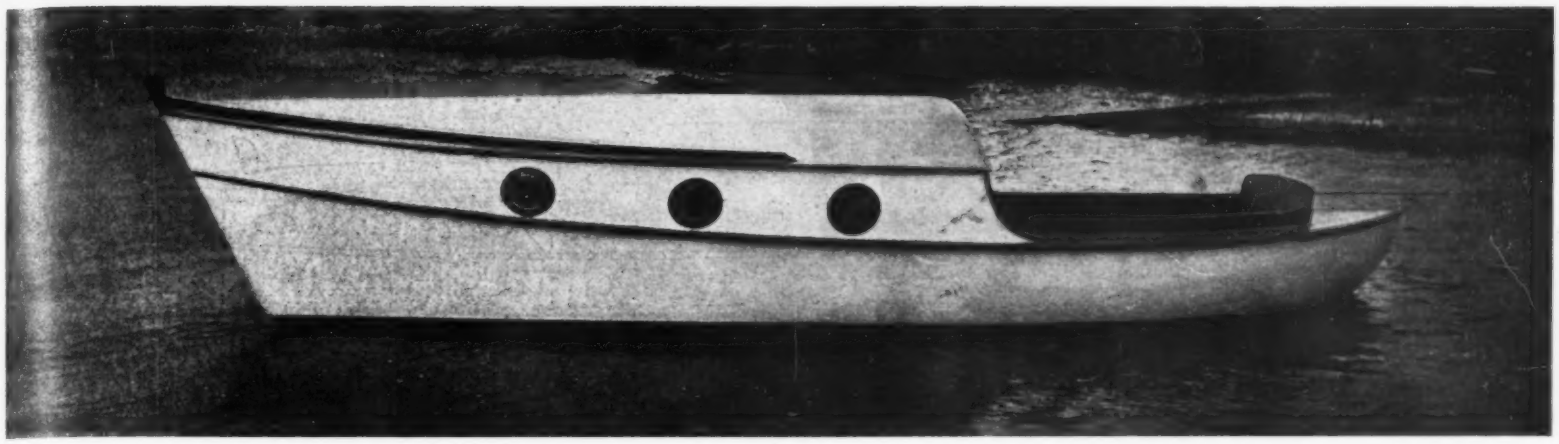
Air is not fuel, and cannot alone run an engine. The ordinary carburetor with an auxiliary air port lets in more air as the engine speed increases, but this is only partially available. The Duryea, it is claimed, is the only carburetor that not only admits more air but also automatically furnishes just the right amount of gasolene to make the air available as fuel.

In actual service it is claimed that the Duryea really gives from 10 to 20 per cent more power to the engine at high speeds than can be secured in any other way.

The Duryea carburetor was designed by Charles E. Duryea, consulting engineer for the N. A. A. N., and the first engineer to develop the spray system in the carburetor.

Later he was granted patents on the first automatic air valve for carburetors, now in universal use. The present Duryea carburetor, therefore, represents a wonderful step forward in the maintenance of a perfect fuel supply regardless of the speed of the engine.

While the price of this carburetor is necessarily somewhat higher, the makers claim that it shows a gain in the power that cannot be had in any other way.



Racine 28-Foot Compromise-Stern Cruiser, equipped with Racine 2-cylinder, 2-cycle, slow-speed, 8-H. P. engine.

Electrically-Operated Engine Room Telegraph and Yacht Lighting Plant

The exhibit of the Richardson Engineering Company, of Hartford, Conn., in space No. 14a, will consist of 14-inch, 9-inch and 7-inch arc searchlights. The 14-inch will interest especially owners of large boats, and it is claimed to be a great improvement over the arc searchlights of this kind in present use. The yoke is of such shape as to be easily polished, and there will be no wires exposed on the outside. The lamp will draw from 20 to 25 amperes at 80 to 100 volts. Their 9-inch searchlights will have a number of new features, some improving the appearance and others the operation. The 7-inch light, which has been very popular for the last season, will be the same as it was last year.

They will also exhibit a new automatic storage battery charging box. This apparatus resembles the original spark coil, being a wooden case of about the same size. Inside, sealed in, is a voltmeter and ammeter of the polarity type, an automatic storage battery charging switch and the control switch. On the outside there will be a lever with the positions marked "off," "charged" and "discharged." On the top of the box there will be a standard plug fuse, and on the bottom the terminals for connecting the wires, plainly marked. On the side will be two terminals for the purpose of taking voltage readings. When the switch is in the "off" position, wires connecting with the side terminals will enable one to obtain the voltage of the generator or of the batteries, and to see that the polarity is correct when connecting up. This little box really contains all that has been placed on their regular switchboard, but it is sealed in, is waterproof and foolproof, and will, no doubt, fill a long-felt want for something well made, reasonable in price and correct in design and finish.

The Richardson Engineering Company will also show a ship's telegraph, arranged to operate electrically instead of mechanically. The dials will resemble the standard mechanical telegraph, but when operated the instrument rings a bell in the engine room, turns on a light in the sector wanted, and "indicates" in that same sector by a white drop. The light will go out when the handle is released, but the drop will stay until a new signal is given. As usual, they will have on exhibition a line of switchboards, fixtures and apparatus and generating units.

A Pair of Attractive Cruisers of Moderate Cost

The well-known Racine Boat Manufacturing Company, of Muskegon, Mich., will show two of their latest model raised-deck cruisers, which will particularly appeal to those desiring single-handed craft which will accommodate from two to four persons on a cruise, and which may be obtained at a moderate expenditure for first cost, and maintained on a small outlay.

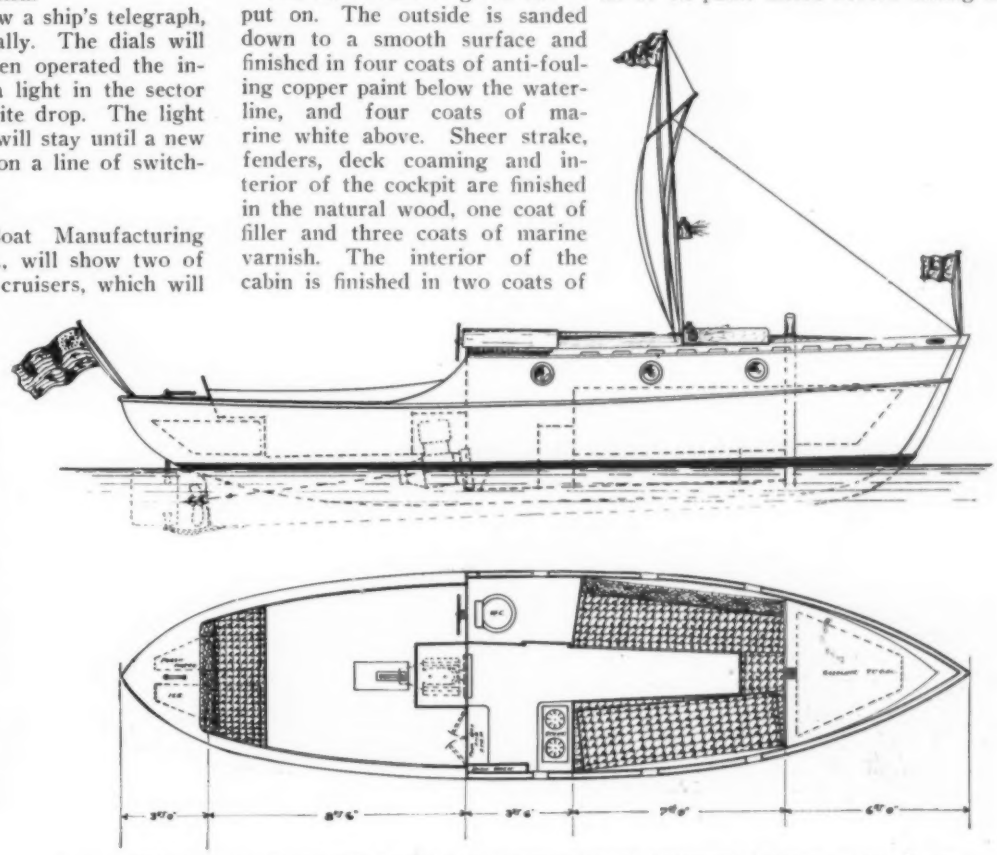
The craft in question are their 1909 model, 25 and 28-foot raised-deck hunting cabin cruisers. The 25-footer has 6 feet 6 inches beam, 2 feet 3 inches draft, and her power is a Racine 2-cylinder, 2-cycle slow-speed, heavy-service engine of 4½-inch bore by 5½-inch stroke, and rated at 8 horsepower, which the makers state will give the boat a speed of 8 miles per hour. She has a 22-inch 3-blade solid bronze wheel, with bronze bearings and shaft, and reversing friction clutch. The motor is so installed that the reverse lever, throttle and spark controls are within easy reach of the man at the wheel.

At the forward end of the cabin are three lockers, the center one being full height of bulkhead, with a shorter locker on each side. On each side of the cabin are seats sufficiently wide to form berths, and underneath these are more lockers. On the port side, opposite engine, is a small locker, the top of which serves as a stove space. Companionway is on starboard side with sliding hatch and hinged doors. Three sliding windows, fitted with heavy plate glass, light each side of the cabin. Seats are cushioned and floor linoleum covered. Cockpit is self-bailing, with draining scuppers, and a large lazy-back seat runs across its after end. In the extreme bow is a chain locker with chain pipe and cover of bronze. Her gasolene tank is of galvanized steel with swash bulkheads and is under after deck and cockpit seat. It has a capacity of 60 gallons.

She has extra heavy galvanized steel stem band, Sampson post, bow chocks, quarter chocks, deck cleats, steering-line deck blocks and flagpole socket, all of polished brass. She has a cowl ventilator as shown, and is equipped with flag poles and flags. The rudder is of galvanized steel of the balance type with polished brass tiller and brass nut, fitted above deck. Her galvanized steel skeg protects keel and stern post and receives the rudder. Her wheel is of polished brass and mahogany, and is located on after cabin bulkhead.

The garboard and sheer strakes are of oak, balance of planking of Louisiana red cypress, all screw fastened. All seams are caulked with yacht cotton and payed with white lead, filled with marine putty. All joints have oak butt blocks, and a half-round fender is fitted around the top of sheer strake and cabin. Cabin roof and carlins are of white oak, sawed to crown, matched and beaded on the under side and covered with 10-ounce duck, properly cemented on and filled with three coats of lead and oil paint. An oak foot rail is fitted on each side of the cabin roof, and a sliding hatch of oak over the companionway. Deck beams are of oak; decking of oak, in narrow strips, beaded and matched, blind fastened and laid in shellac. Covering boards and cockpit coaming are also of oak.

The entire boat is given two coats of oil paint inside before ceiling is put on. The outside is sanded down to a smooth surface and finished in four coats of anti-fouling copper paint below the waterline, and four coats of marine white above. Sheer strake, fenders, deck coaming and interior of the cockpit are finished in the natural wood, one coat of filler and three coats of marine varnish. The interior of the cabin is finished in two coats of

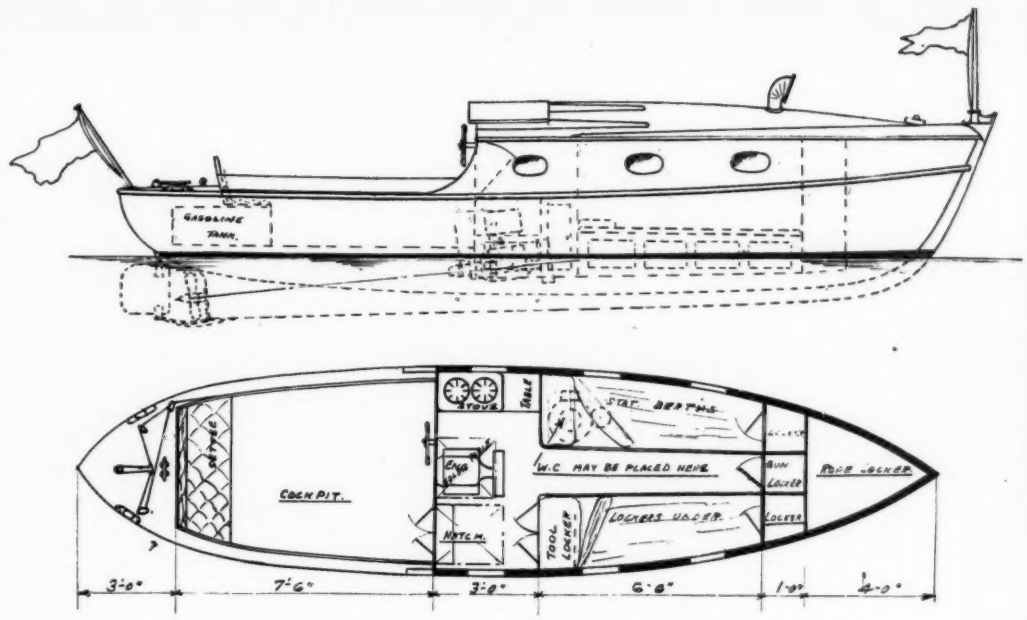


Plans of 28-foot Racine Compromise-Stern Cabin Cruiser, of which photograph is shown at top of page.

white lead and oil and one coat of white enamel.

The 28-footer is an enlarged craft of the same model. It is 28 feet 3 inches over all, 7 feet 9 inches beam, 24 inches draft, and is powered with the same engine, the location of which has been changed by placing it aft under the cockpit flooring. As will be seen by the plans herewith, she has more conveniences, and gives sleeping room for three or four people in her cabin. Her finish and construction is practically the same as that of the 25-foot boat.

These boats were built to enable prospective purchasers to take advantage of the new Racine installment payment plan by which a man may enjoy the use of his boat while paying for her. By means of this installment payment plan she may be purchased in ten equal payments of 10 per cent. each, a plan which the Racine Company claims has never before been put into operation by a boat-building concern on craft of this size.



25-foot Compromise-Stern Racine Cabin Cruiser, with engine in cabin.

For Heavy Duty in Heavy Boats The exhibit of the Wolverine Motor Works, Inc., of Bridgeport, Conn., will be in space No. 9, and consist of one each of their 18, 36 and 50-hp. engines. The Wolverine has the general appearance of simplicity and durability, with all moving parts easily accessible,—the gears, cam shaft, cams, water pump, air pump and igniter mechanism being all on the outside of the engine.

The lubrication is mechanically operated, sight-feed oilers lubricating all inside bearings, the outside bearings being lubricated by compression grease cups or through suitable oiling places.

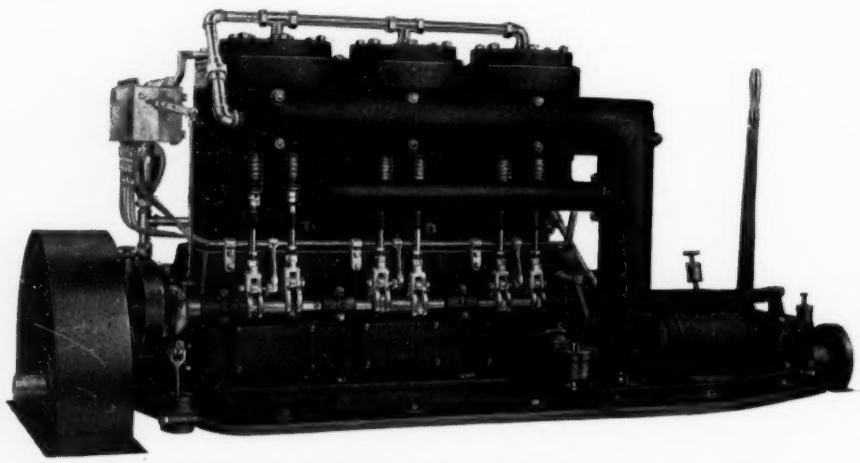
The reverse motion is through a spur-gear reverse clutch, which is shown at the after end of the engine, the back-up, go-ahead and neutral being controlled by one lever only, this lever also locking clutch in place either on the go-ahead or back-up without the use of any auxiliary lever.

One lever controls the speed. This lever advances or retards the spark, there being a connection from the foot of this lever through the base of the engine to carburetor, the opening and closing of the carburetor being thus controlled at the same time that the spark is advanced or retarded. This insures a proper fuel consumption corresponding to the rate of speed at which the engine is running, and makes the engine very easy to handle.

For access to the crank case it is only necessary to turn up latch levers on the doors which give access to the crank case; the doors, being hung on hinges at the bottom, drop down, allowing ample room for the operator to examine the inside crank shaft or connecting rod bearings and make any adjustments that may be necessary.

If one wishes to have access to valve chambers, it is only necessary to come up on one union, which is in the overflow pipe, between the valve chamber heads and the water-jacket around the exhaust pipe. The tees which connect this overflow pipe to the valve chamber heads,—the highest point in the engine—are special fittings, and are flanged and connected to waterjacket in valve chamber cap by cap screws, not screwed in. The valve chamber heads, or caps, are removed by simply taking off the nuts on stud bolts which hold them in place, giving access to one valve chamber or more, as necessity requires.

If necessary to remove a cylinder head for any purpose, the only piping necessary to remove is the water pipe mentioned above, it not being necessary to remove any part of the exhaust, intake or any other part of the engine. Each cylinder and each head being separate, it is necessary to remove only the part that may require looking after in making repairs.



36-H. P., 3-cylinder Wolverine Engine, which may be operated with gasolene, kerosene or distillate as fuel.

These engines are fitted for using kerosene, gasolene or distillate, and will operate equally on any of these fuels without forming carbon when being run on the heavier fuel oils.

They are designed and constructed for heavy and continuous service, are suitable for use in reasonably heavy pleasure boats, cruising yachts and working boats of all kinds.

The ignition is of the make-and-break type, the stationary and movable electrode being both in one part, it being necessary to take out only two cap screws to remove the entire exploder if it is necessary to do so for any purpose.

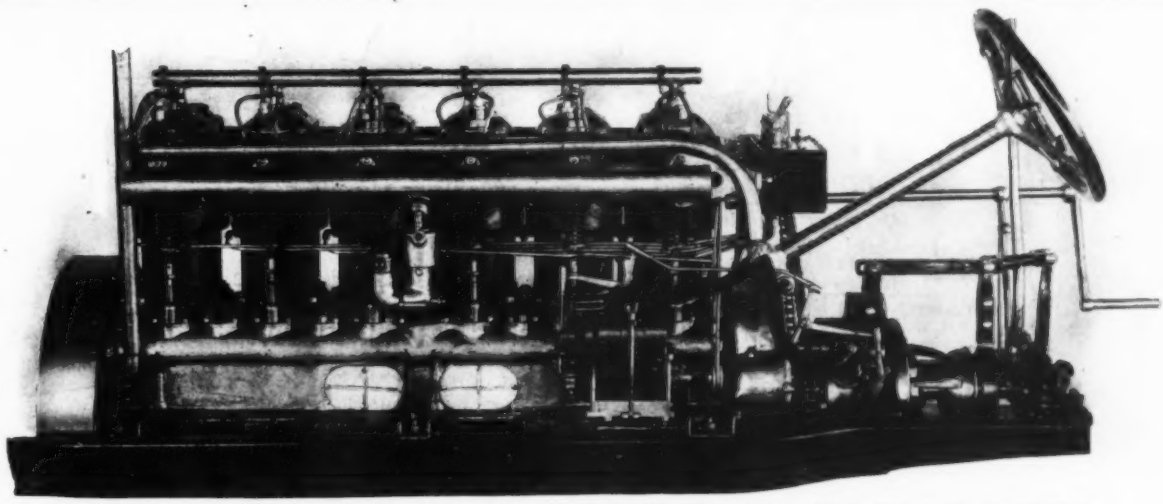
A Truly Regal Collection The Regal Gasoline Engine Company, of Coldwater, Mich., in addition to their older models of four-cycle engines, will exhibit in space No. 49 the following new products: A 4-hp. single-cylinder high-speed marine engine, four-cycle, with mechanical valves, cylinder 4¼-inch bore by 4½-inch stroke, diameter of crank shaft 1⅝ inches, diameter of balance wheel 16 inches. Weight of engine 340 pounds. Crank shaft bearings are bronze, and adjustable. Connecting rod has babbitted bearing at shaft end, bronze bushing with take-up at piston end. Piston has three rings above and one below. Connecting rod bearing on crank shaft is lubricated by ring oiler, which is supplied from cup on rear of engine. Valves are large and easily accessible. Exhaust pipe connection is 1½ inches.

An 8-hp. double-cylinder engine is shown with extended base and reverse gear, with two cylinders like the one on the 4-hp. engine and the same general construction. Crank shaft is 1⅝ inches in diameter. Engine, as shown in cut, weighs 615 pounds, and measures 48 inches from face of balance wheel to center of clutch coupling on tail shaft of reversing gear. Exhaust pipe connection is 2 inches.

There is also a 16-hp. four-cylinder engine with extended base and reverse gear, and cylinders of the same size as the ones used on the 4-hp. and 8-hp. engines, and 1⅝-inch crank shaft. Engine weighs, as shown in cut, 925 pounds, and measures 63 inches from face of balance wheel to center of clutch coupling on tail shaft for reversing gear. Exhaust pipe connection 2 inches. Inner lubrication is from ring oilers as on the 4-hp. and 8-hp. engines. A 1-gallon, eleven feed, multiple oiler, located on the side of engine, furnishes the oil for distribution. These engines are all four-cycle.

They will also exhibit the following heavy-duty, slow-speed engines, all make-and-break spark ignition: 5-hp. single-cylinder engine, weight 550 pounds; 7-hp. single-cylinder engine with extended base and reverse gear, weight 1,000 pounds; 14-hp. double-cylinder engine with extended base and reverse gear, weight 1,460 pounds; 28-hp. four-cylinder engine with extended base and reverse gear, weight 2,100 pounds.

The heavy-duty, slow-speed engines are also made with jump-spark ignition if preferred. All engines are four-cycle with mechanical valves.



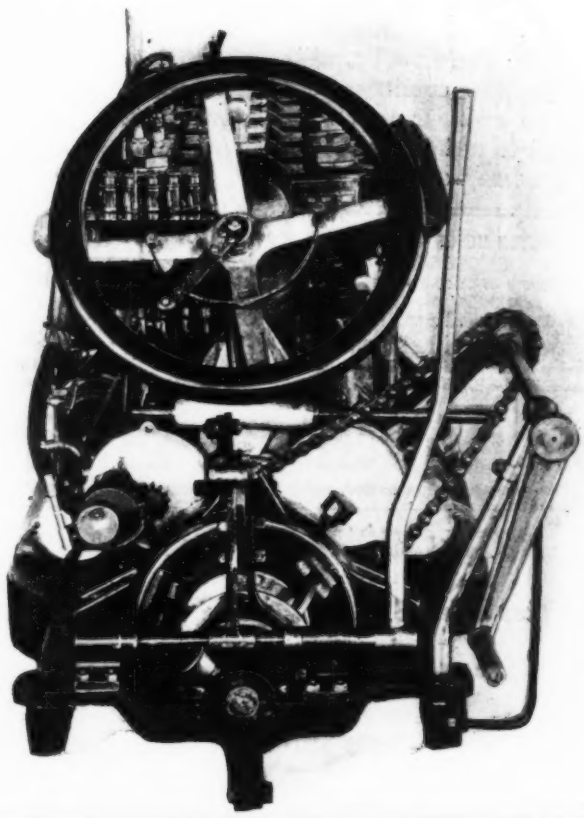
6-Cylinder, 4-Cycle, 5 x 5½, 70 H. P. Motor, suitable for Runabouts, High Speed Boats, Built by

JENCICK MOTOR MFG. CO.

Motors for Cruising and Speed Boat Purposes

IN SIZES
10 to 210 H. P.
500 to 1,000 Revolutions

OPERATED BY ONE MAN



MANUFACTURERS OF A REVERSE GEAR, capable of holding from 100 to 210 H. P. without slipping. ¶ Write for particulars, giving full information.

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Patterson Wireless Dry Battery Holder

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ALL STEEL BATTERY BOX

ADMITTEDLY the BEST Battery Equipment for Motor Boats, BECAUSE

1 No binding posts or wires—setting up or renewal of battery as easy as an incandescent lamp —in fact, done in the same way!
2 Connections can't jar loose! Contacts positive and instantly made!
3 Moulded rubber composition plate over rubber gasket water-proofs batteries absolutely!
4 Automatic bridge in each receptacle permits removal of an exhausted cell without interrupting circuit.

You'll not bother with the old style Binding Post Battery after you've seen this Battery Box.

It's IDEAL! Each unit renewable—no knowledge of electrical matters required; made 6, 8, 12 (2 series of 6) and 16 (2 series of 8) cell capacity. The **MOST TALKED of invention in the electrical field! Send for Bulletin "37."**

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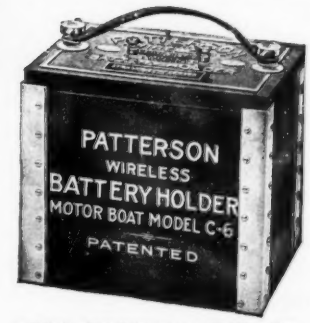
"Columbia," "Eastern," "Nungesser Acme," "Stackpole Autocrat," "Hi-up," "Red Seal," and "Rock Island" batteries now made regularly in this "Screw Top" Style; just specify **"Patterson Screw Top."**



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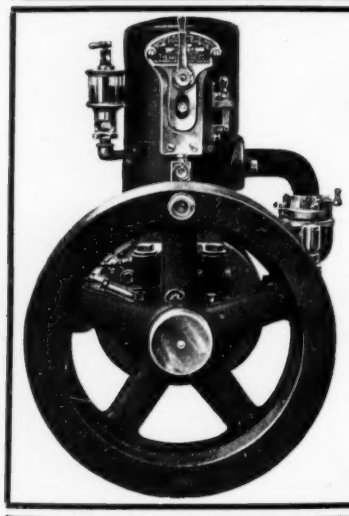

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The Engine of SIMPLICITY of SATISFACTION of DURABILITY

¶ Note the absence of complicated piping. ¶ Of the hundreds of Fulton Engines which have been sold, not one has been found unsatisfactory. ¶ Send for our handsome Catalogue :: :: :: ::

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The perfect running of your automobile or motor boat depends on a perfect ignition current. Most storage batteries are good when they are new, but to get a storage battery that is absolutely reliable, durable, and that will stay as long so as you need it, insist on the

Hubler-Dayton Storage Battery

Not simply "guaranteed against defects," but guaranteed to give service—you can get more miles of running out of the Hubler-Dayton Battery than any other made. The latest triumph of the largest concern in the United States making exclusively ignition apparatus.

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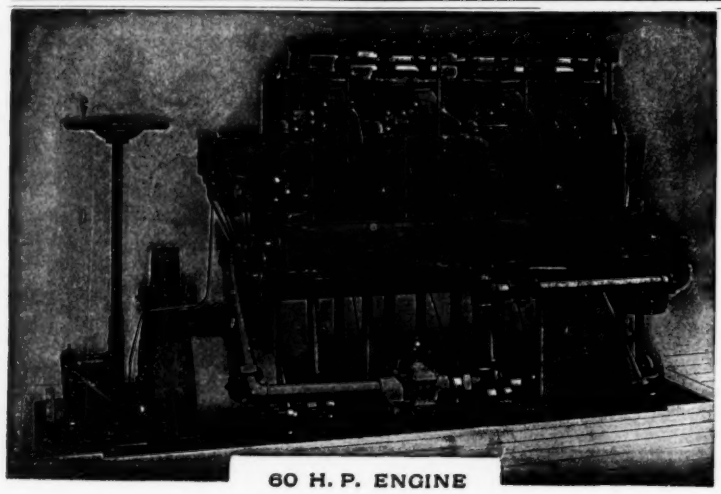

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With 6 H. P. Single Cylinder, 2-Cycle Boothbay Engine developing its rated horsepower at 400 revolutions per minute

Specifications—Keel, s em, stern and frames clear oak; planking, white cedar, copper fastened ; deck, white pine, covered with canvas ; waterway, coaming and battens, oak ; cock-pit floor, white pine ; seats, backboard and cabin finish, cypress ; open brass port lights ; brass and mahogany steering wheel, with wood drum ; polished brass deck fittings ; bronze rudder and post. Aft deck, cock-pit and interior work, finished natural wood ; outside, above water line, painted white ; below water line, light green.

There is plenty of cabin room for three, and locker space for all necessary supplies.

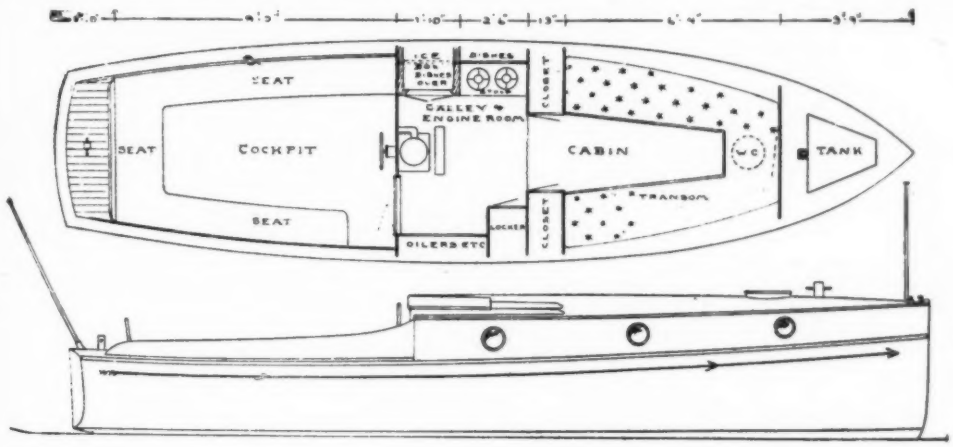
All in all, she is a mighty big little boat, in fact she is **all** boat, with no frills or fancy fixings to eat up your bank account, but she does contain all the essentials of a tight, weatherly little cruiser.

This boat is turned out at one of the most successful yacht building plants in the country, for we have been building yachts for fifteen years, and during that time have constructed many well-known individual boats and classes. For example :

The 125-ft. auxiliary schooner "Constance."

The 90-ft. schooner "Clarrisa."

The 21-ft. raceabout class of the American Yacht Club were built at our yard. Our plant is complete in every detail, with full equipment, including machine shop. We are in a locality where labor and the finest lumber for yacht building are abundant.



Send for detailed description of the above cruiser (the plans are shown herewith). Also for our booklet showing plans and description of other craft from 21 to 50 feet.

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EJECTOR MUFFLER

The Standard Muffling Device. 30,000 in use. Eliminates the noise without reducing the power. Built of non-rusting material. For Exhausting Under Water use the **"Rational Underwater."** Address

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Buy an

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¶ We are headquarters for the famous Swampscott Clipper Dories and are the only builders of the 21-ft. Club Dories; 18-ft. Sailing Dories; 17-ft. Riverside Dories.

Also build Power Dories, Skiffs, etc.

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SPRAY HOODS, AUTO BOAT TOPS, LAUNCH AWNINGS, BOAT CUSHIONS, ETC.

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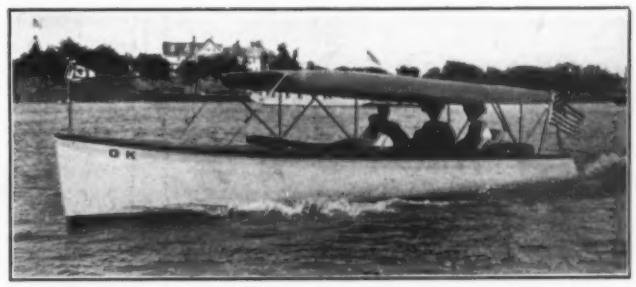
The largest manufacturer of Boat Tops in the world.



The McClellan Folding Auto Top—The only Practicable Top Made.

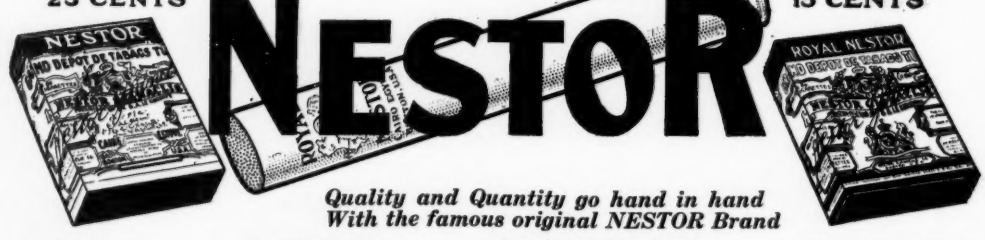
WE are building only high grade boats at reasonable prices. Our many patrons will tell you the same. They number men high in the financial as well as business world. Every one of them has been more than pleased with the boats we have built for them. We ask just one trial, after that we leave the matter in your hands.

Goble Boat Co., DESK Y Oswego, N.Y.

"NESTOR" Green Label 25 CENTS

IMPORTED 40 CENTS

"ROYAL NESTOR" Blue Label 15 CENTS



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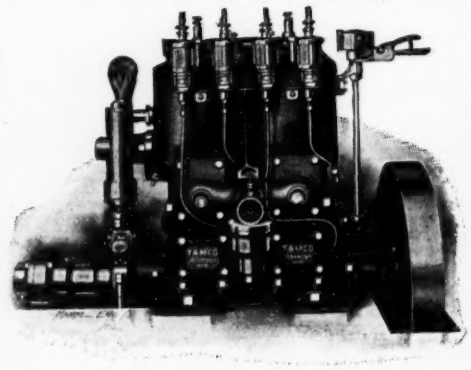
THE REMINGTON OIL ENGINE COMPANY
MARINE AND STATIONARY STAMFORD, CONN., U. S. A.



T & M
Reversible Engines
ALWAYS LEAD
Termaat & Monahan Co.
OSHKOSH, WIS.

THIS boat is 18 ft. long, 57 ins. beam, and is equipped with our 6 h. p. gasoline motor and reverse gear. The motor is installed by us, and there is not one cent of expense to you for any kind of fittings or connections. It will cover **ten statute miles** in one hour with three passengers, and will seat ten passengers with safety and comfort. The motor is under the forward deck. The boat, motor and equipment are best quality throughout. The price is $225.

We will send you further descriptive matter on request. Also catalogs of our gasoline motors and kerosene motors, and know that we will interest you in motors and in this boat.

DuBrie Motor Company
420 Guoin Street Detroit, Mich., U. S. A.

Gasolene in Deep Sea Windjammers

(*Continued from page 30.*)

Mr. Thomas, an ardent sportsman, has, for several years, made his headquarters during the gunning season on the waters of Albermarle and Pamlico Sounds. To use Ednada successfully on these shooting trips, rendered it necessary that she draw not more than 6½ feet of water, and her owner further stipulated that her engine should be capable of giving her a speed of 7½ miles per hour under bare poles in calm weather.

The latest addition to the ranks of American-designed and built seagoing gasolene auxiliaries is Haida, the schooner designed by Cox & Stevens for Max C. Fleischman, of Cincinnati, and launched in the early part of 1908. She is 106 feet 6 inches over all, 75 feet waterline, 24 feet 6 inches beam and 5 feet 6 inches draft. She was built for use mainly in Southern waters and on hunting and fishing trips, and her 200-hp., six-cylinder, four-cycle gasolene motor gives her a speed of 9 knots under power. Her gasolene tank is sufficiently large to give her a cruising radius of 1,000 miles under engine only.

The gasolene engine, for its horsepower, is light in weight, and capable of being placed almost anywhere that the design of the boat or the interior plan renders necessary, and thus equipped it is possible for a craft to make, under engine alone, a fair speed.

The safety in which for years these boats have been operated is the best kind of refutation of the charges of our friends across the water, and there is no question whatever as to the desirability of this type of motor in a craft for off-shore cruising.

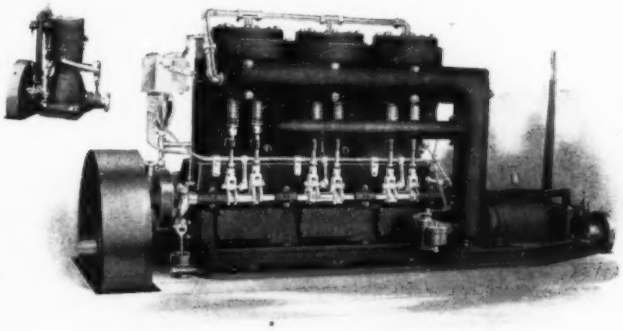
An Up-to-Date Cruiser of Moderate Cost

(*Continued from page 21.*)

underneath. The gasolene tank, of 60 gallons capacity, giving her 400 miles cruising radius, is under the after deck. The cabin is entered by means of a central companionway which leads into a narrow passage with a stove space on the starboard and an ice box and dish rack on the port side. Forward of this are extension berths on each side, with lockers underneath. There is a skylight ventilator 24 x 30 over the forward end of the cabin and two 7-inch swinging port lights on each side. Forward of the cabin, from which it is separated by a bulkhead with swinging doors, is a lavatory with two large lockers on each side and lighted by two 6-inch swinging port lights. Forward of this is a chain locker with fresh-water tank underneath.

It will be readily perceived from the foregoing, which are actual descriptions of craft already built, and carried in stock by their makers, that the man who really wants to live on the water this coming season and has from six hundred dollars to a thousand with which to purchase, has been taken care of unusually well. Moreover, all of these craft are so arranged that they can be operated on a minimum expenditure for fuel and without a paid hand. They are not too large to be handled comfortably by one man.

When it comes to figuring out the cost of the boat, it should be taken into consideration that, if given good care, these boats should give their owners at least four years' service and then be sold for at least 50 per cent. of their initial cost. This means for the 30-footer less than $125 a year to be charged against the purchase price—and in the smaller sizes a proportionately less amount—and if anyone can get more enjoyment out of an expenditure of $10 a month than one of these craft will produce, he is exceedingly fortunate in his investments.



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RELIABLE SALES AGENTS WANTED

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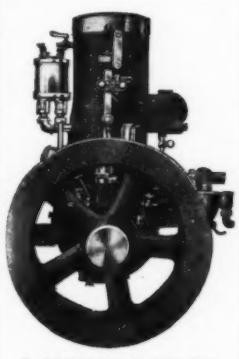

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Driftwood

Among the new boats being built for these waters are two under way at Morris Heights that will attract much attention next summer. The first of these is a twin-screw steam yacht of 133 feet for Mr. M. C. D. Borden, N. Y. Y. C., which has already been laid down. The chief feature of the new boat will be her speed, which in the contract has been guaranteed to be 30 miles an hour in regular service when required. This looks very much like the coming champion in the steam yacht fleet, and all who are familiar with the many high-speed craft turned out under Mr. Seabury's directions are sure that the speed mark that Mr. Borden requires will be easily reached. The second of these later Seabury commissions is a triple propeller gasolene yacht for Mr. Julius Fleischmann, of Cincinnati, member of the New York Yacht Club, which will be 115 feet long. This is the largest of the power-yacht type of craft yet built, and she will prove all the more attractive because she will be very fast. Mr. Seabury has agreed that she shall show a speed of 26 miles an hour in regular service if her owner desires to travel that fast.

There will be a class of Sonder boats in Buzzard's Bay next season, and among those interested in the scheme are such well-known skippers as J. Lewis Stackpole, who sailed Spokane I at Kiel; "Bob" Emmons, owner of Avenger; W. O. Gay, owner of the 70-footer Athene; Mark Hopkins and Elmer Smith.

Commodore Childs was the first yachtsman in the country to place an order for a Sonder class boat this year. Hardly had the announcement been made that the Germans were coming next summer, when the senior flag officer of the Bensonhurst club commissioned C. D. Mower to design a craft. The new boat will be named Miss Brooklyn and will be built at Lawley's yard.

The Colonial Yacht Club, under whose auspices the successful Motor Boat Carnival was held last September, and which, though but in existence but a few years, dominates power racing in New York City, held its annual election in December. Commodore Vestner was re-elected for the third term, and with him, S. W. Granbery for vice-commodore; Charles Colvill was elected rear commodore; Ernest Eberlein, secretary. The members have now joined hands in fighting hard for the success of the coming entertainment and ball, to be held on January 21, 1909.

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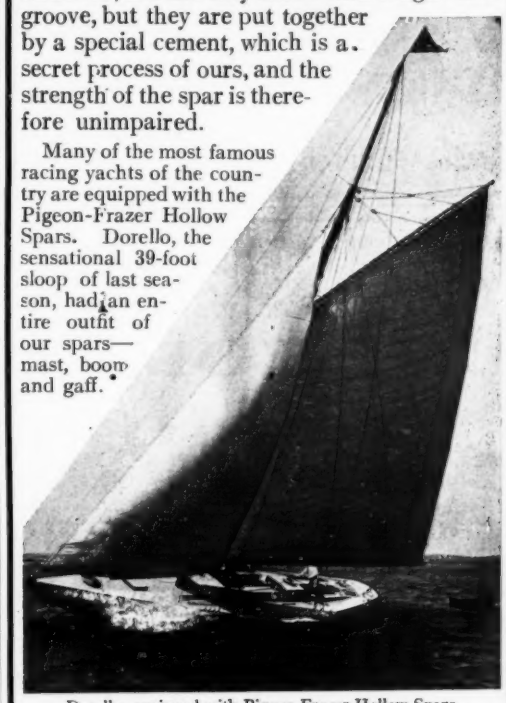

Dorello, equipped with Pigeon-Frazer Hollow Spars.

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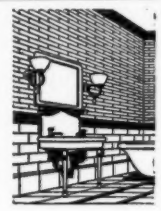

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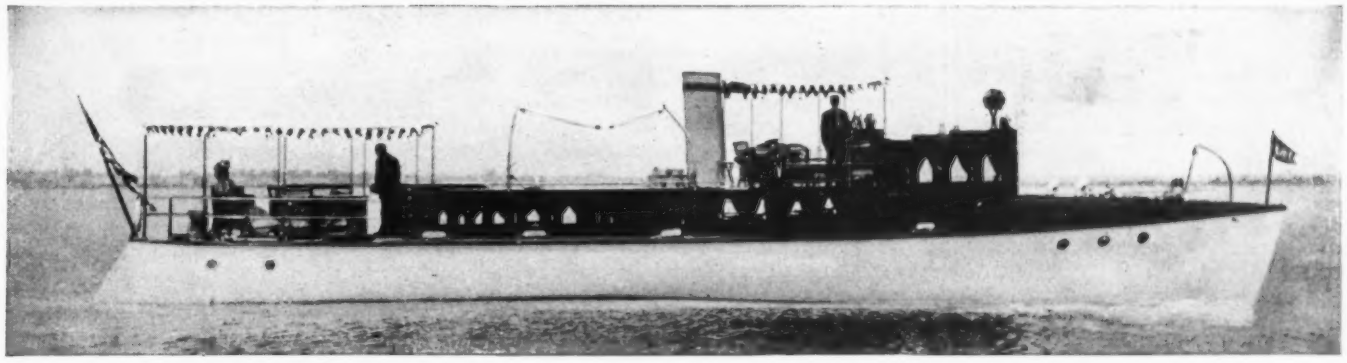

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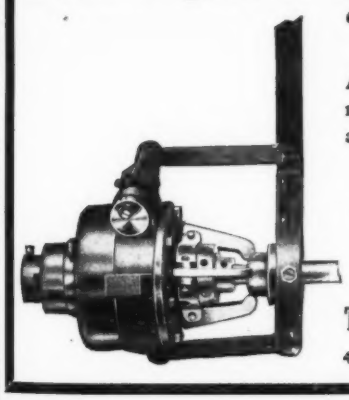

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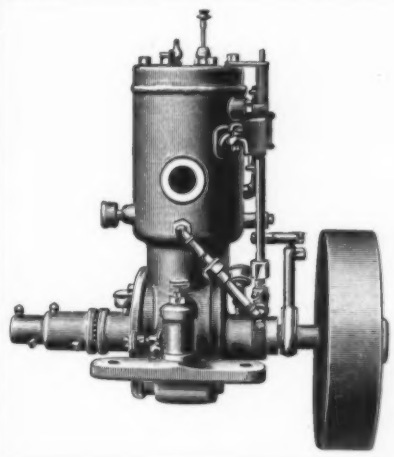

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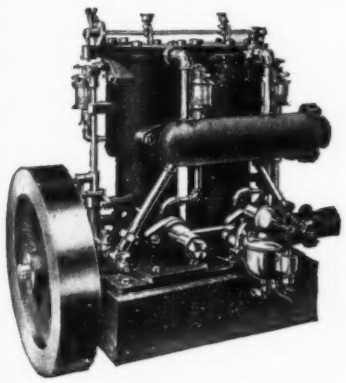

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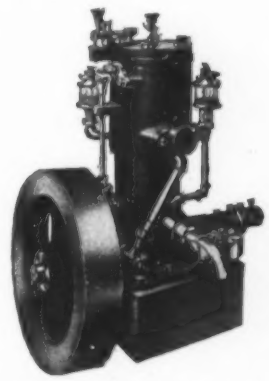

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Michigan Wheel Co.
Grand Rapids, Mich.

THE FAMOUS MICHIGAN SPEED WHEELS

THE FAMOUS MICHIGAN REVERSE GEAR

Vital Parts of a Marine Engine

(*Continued from page 27.*)

tain their normal voltage, they are available for other purposes, such as furnishing current for ringing bells or operating small incandescent electric lights.

The pocket ammeter is almost a necessity for the man who does not wish to suffer from more than his share of ignition troubles. These little instruments are made in a form resembling a watch, and will give ampere readings up to thirty. Systematic readings should be made every week or so, to avoid the danger of becoming caught out in the middle of the stream with wornout batteries and no new ones on hand. The same ammeter which is used for testing the batteries cannot be used in connection with the coil, for the instrument for the former purpose is not divided into fractions of an ampere and would not indicate the exceedingly small current consumption of the coil.

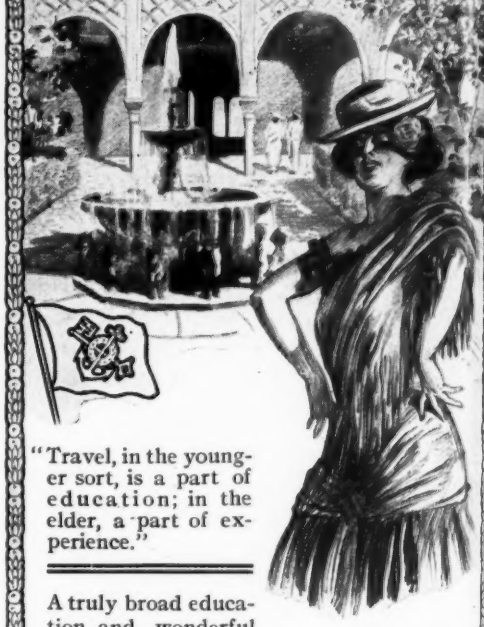
There are so many factors which affect the life of a single or a double set of batteries that it is impossible to state definitely what service a dozen dry cells should give. This depends on the adjustment of the coil, the number of cylinders of the engine, the speed of the motor, the length of time that a single set will be used without a rest, and a hundred and one other details which appear, at first sight, to be inconsequential. The writer has had considerable experience with a three-cylinder, two-cycle marine motor running at a speed of about 500 revolutions a minute, and has found that two sets of six batteries, used alternately, will last for slightly over 100 hours of intermittent running, thus giving about fifty hours for each set of six. Assuming the speed of the boat to be ten miles an hour, it will be seen that twelve batteries will last for about a thousand miles of actual running.

It is not to be inferred that these two sets of batteries will last for a thousand miles of *incessant* running, or even for a half of that distance, for they must be given opportunity to recuperate. This ability to regain strength, to a certain extent, by remaining idle for a time, is one of the strong points in favor of the dry cell.

The same cautions which apply to the ignition system of a single-cylinder motor will also hold good for a marine engine of more than one cylinder. In this case, a separate coil for each cylinder may be used, as shown in Fig. 4, or, by the addition of a "distributor," a single coil may be made to furnish the spark for all of the cylinders, as indicated in Fig. 3. In the majority of marine motors the former system is employed, but in a number of cases the latter arrangement has been used, and has been found to be very successful and to require but little more attention than the ignition of a single-cylinder motor. The only fault which can be found with this system is that the high-tension mechanism is made slightly more complicated by reason of the addition of the distributor; but if this, as well as the timer, is kept perfectly clean and thoroughly oiled, no trouble should be anticipated. The necessity for coil adjustments also is reduced to a minimum, although the extra strain put upon the coil is considerable. Great care should always be exercised in keeping the timer and distributor entirely free from the small grains of copper which are liable to accumulate on the moving parts of the ignition mechanism. This copper dust, if allowed to deposit, is almost certain to provide an easy path for the current and thereby render a short circuit inevitable.

Of course, many of the ignition troubles mentioned in the foregoing paragraphs may be overcome by the use of a magneto or storage batteries; but these will be found only on the higher-priced engines.

CRUISE TO THE ORIENT



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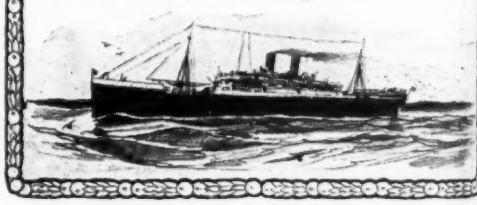

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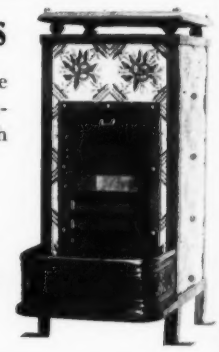

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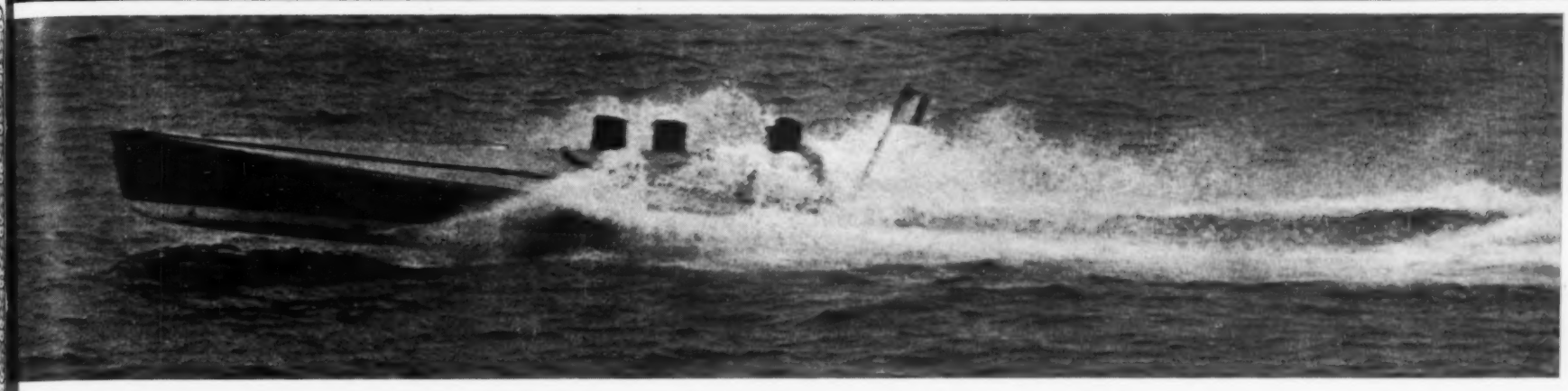

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UNDER WAY—THE CRISP SPRING BREEZES AWAKEN THE DESIRE FOR AN EARLY FITTING OUT.

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VOLUME V. NUMBER 2

February, 1909

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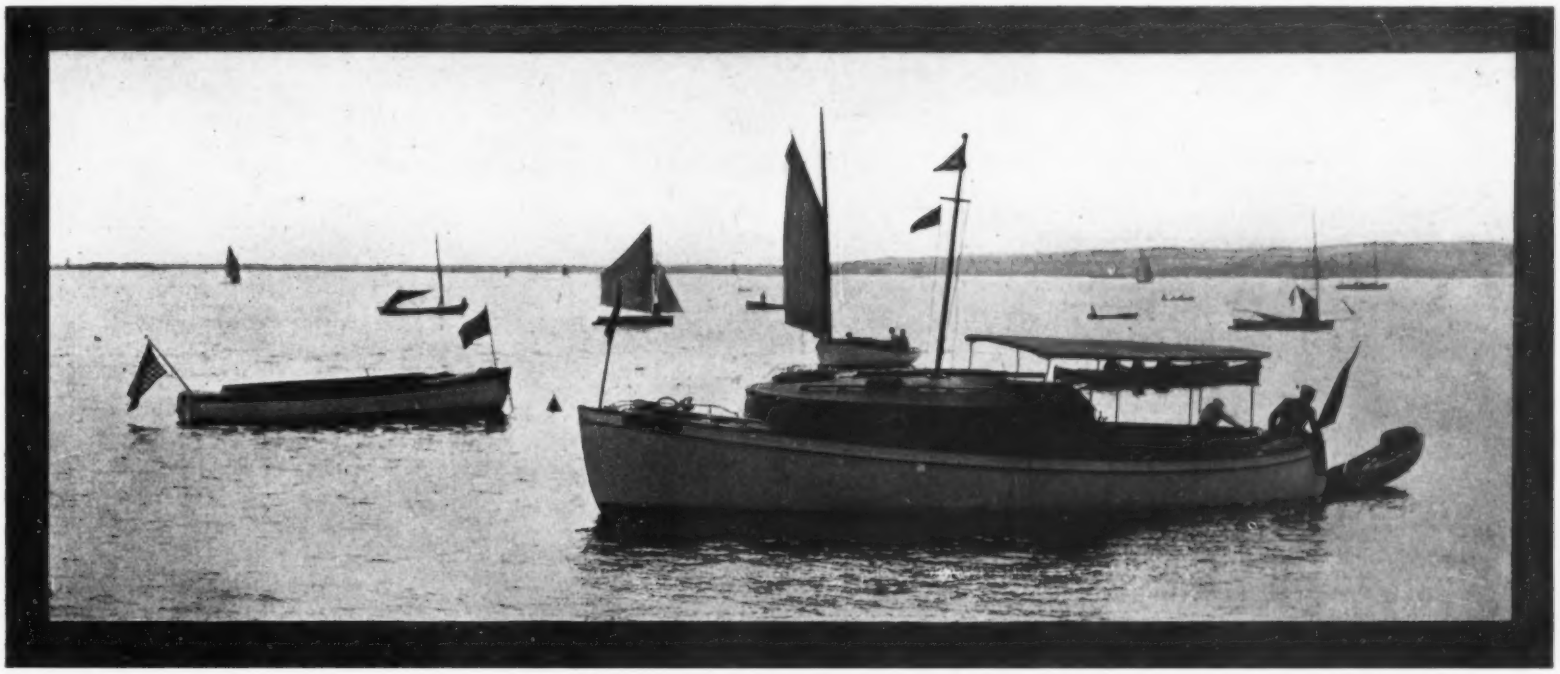

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An Up-to-Date Cruiser of Moderate Cost

PART II

A SURPRISING AMOUNT OF COMFORT IN A POWER CRAFT OF FROM THIRTY TO THIRTY-FIVE FEET IN LENGTH—WHAT MAY BE HAD ON AN OUTLAY OF LESS THAN TWO THOUSAND DOLLARS

By E. T. KEYSER

Illustrations by courtesy of Western Boat & Engine Company, Goble Boat Company, Nilson Yacht Building Company, Edwin Levick and James Huntington

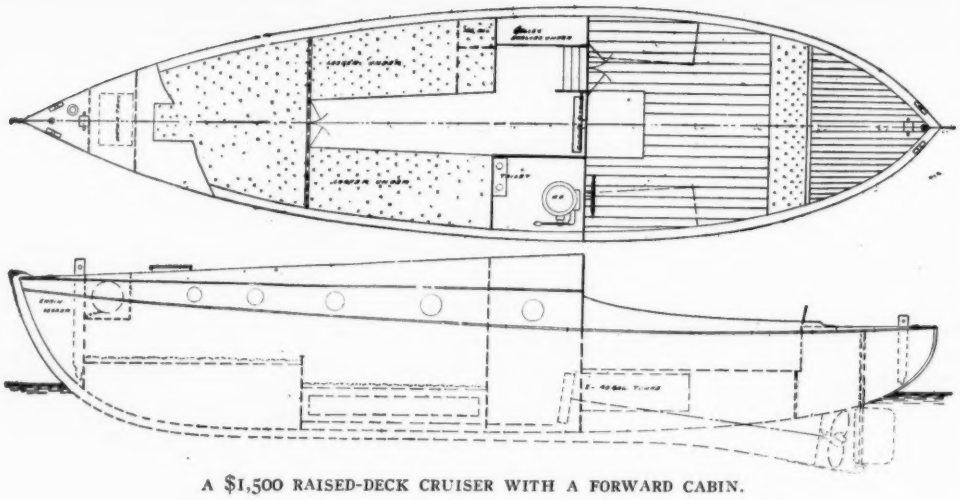
INSTEAD of taking a cottage near the water this coming summer, many of the readers of YACHTING are considering, instead, the feasibility of procuring a floating home on the water itself. That it will not cost nearly as much as it would have a decade ago, was explained in the last issue of this magazine, wherein the prospective owner of a cruising power boat was shown what could be secured for less than $1,000. This month it is the turn of the more fortunate individual who feels that he can place his limit one thousand dollars higher.

For every additional dollar expended on a craft from a reliable builder, the purchaser obtains an equal amount of comfort and convenience. It is for this reason that the boats described in the following article give the prospective purchaser a much wider range of choice in model, equipment and finish than in those described in the previous article.

A 31-FOOT RAISED-DECK CRUISER WHOSE UNDERBODY SHOWS FINE, EASY LINES.

For instance, here is a cruiser that, all complete and ready to start upon the cranking of the engine, can be purchased for $1,800. She is 30 feet in length overall, has a trifle less than 8 feet beam, and draws 30 inches of water. As will be seen by glancing at the plans, she is of the older type of compromise stern, trunk cabin boat; a style of craft which, in spite of the great popularity of the more modern raised-deck type, has warm advocates among many of the cruising fraternity.

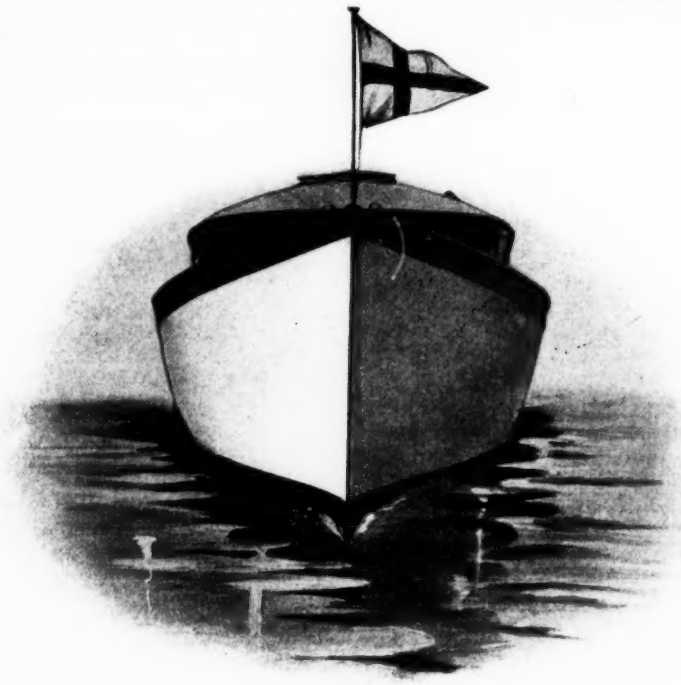
The tumble home in her stern reduces the after deck to a size just sufficient to allow



A $1,500 RAISED-DECK CRUISER WITH A FORWARD CABIN.

the installation of a towing bitt. Forward of this after deck is a cockpit 6 feet 9 inches in length, oval at its after end, self-bailing, and left perfectly open for chairs. A companionway on the starboard side of the after cabin bulkhead leads down into the combination engine room and galley, which is 4½ feet in length. The two-cylinder, 2-cycle, 15-horsepower engine is installed as close to the after bulkhead as possible, so as to allow plenty of room between the fly-wheel and the door separating the engine room from the main cabin. A stove space, with refrigerator underneath, and a sink and shelves occupy the full length of the port side of the compartment. The main cabin is 7 feet 3 inches in length, with extension transom berths on each side. Forward of this is a small room 3 feet in length, separated from the main cabin by a swinging door. On each side of this room are large lockers, reaching from the floor to the deck.

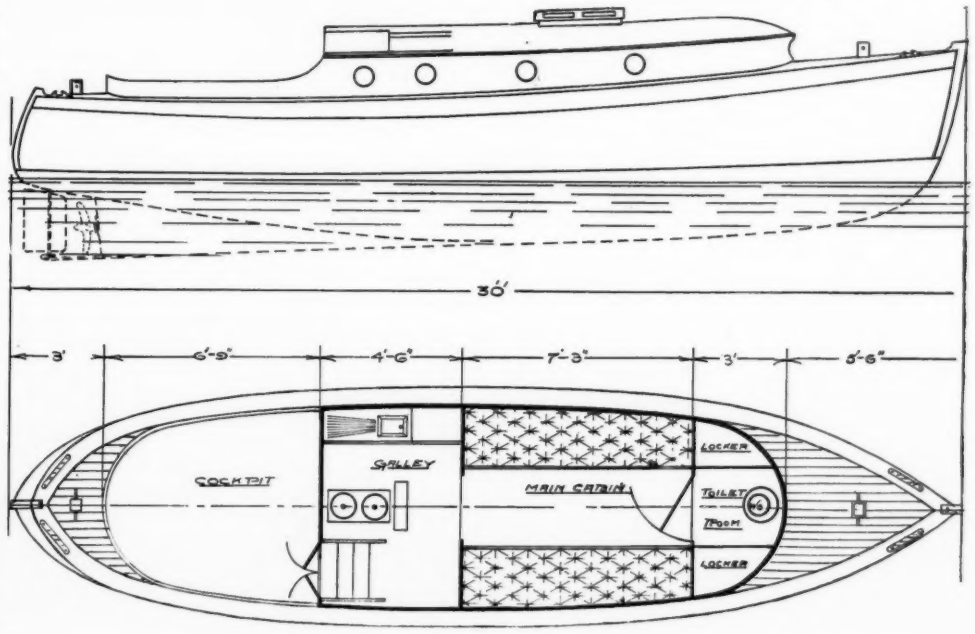
The galley-engine room is lighted by four 6-inch port lights, two on each side. The main cabin is similarly fitted, and in addition to these port lights there is a central skylight. The lavatory, which is under the forward portion of the cabin trunk, is lighted by a single port, directly in the center, giving a view ahead and allowing the skipper to inspect the condition of his moorings without going outside. Her 5½-foot forward deck is sufficiently ample to allow the handling of her ground tackle, and the long, low-cabin trunk, giving 6 feet headroom, affords a splendid lounging place when at anchor or underway in pleasant weather. She is a boat large enough to afford sleeping accommodations to a party of three, or to allow of two living aboard for an entire summer. She is heavily built, with keel of selected oak, heavy and closely spaced frames of the same material, cypress planking and her interior finish is in panelled oak.



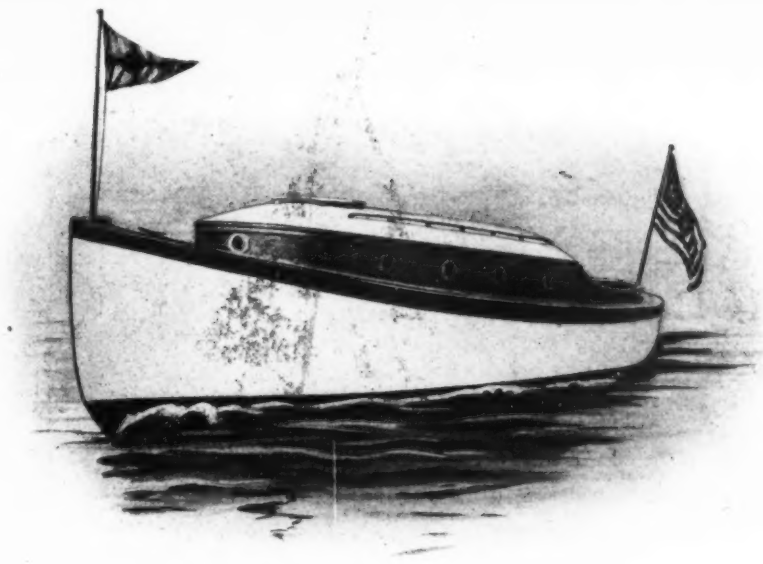
BOW VIEW OF 30-FOOT TRUNK-CABIN LAUNCH

Perhaps, like the late lamented Mrs. Boffin, you are a high-flyer after fashion, and it is the raised-deck cruiser, and nothing else, which will fulfill your ideas of a boat. If so, here is a craft of this type, which, complete with engine equipment, plumbing and everything else, will cost $1,500. She has a rather unusual arrangement, inasmuch as the occupants of the forward cabin are supposed to sleep on the floor. This is not as inhospitable as it may seem, for, instead of a carpet, the floor is covered with leather, cork filled, cushions, which serve as mattresses. The floor of this forward cabin is raised, making a divan transom, and is higher than that of the main or after cabin. This space under the flooring is utilized as a storage space, which is entered by a couple of swinging doors. The main cabin is 6 feet in length, with extension transoms on each side. Underneath these transoms are lockers. The ice-box is also underneath the after end of the starboard transom. Aft of the main cabin is a galley and engine space, entered by means of a companionway at the starboard side. The galley shelves and stove space run the full length of the starboard side of the galley, and there is a 3-foot lavatory on the port side.

In this boat the engine room has been practically eliminated, the engine being installed under a hatch at the forward end of the cockpit, with the fly-wheel projecting just far enough into the



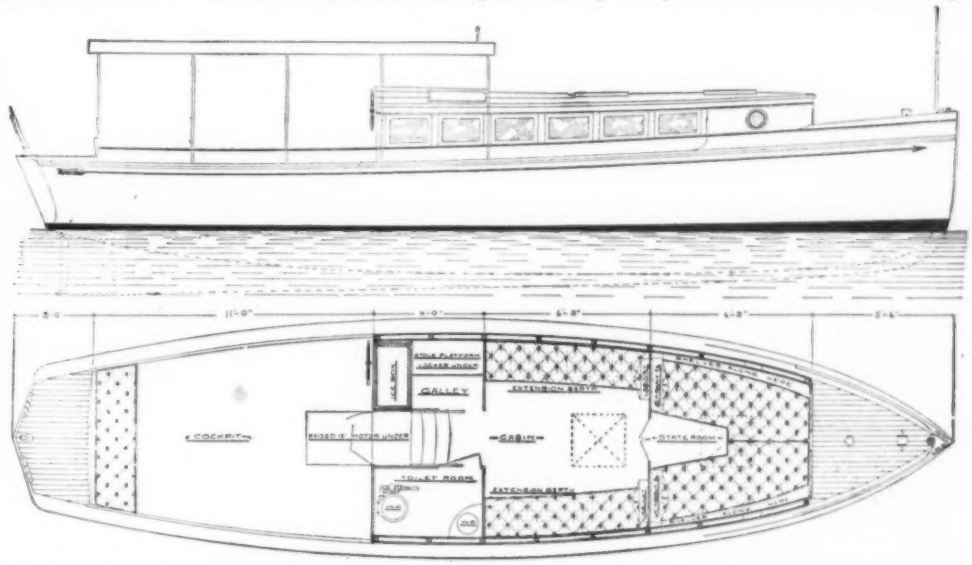
PLANS OF A $1,800 TRUNK-CABIN HUNTING LAUNCH, SHOWING A VERY COMFORTABLE ARRANGEMENT BELOW.



A 30-FOOT TRUNK-CABIN LAUNCH OF THE COMPROMISE-STERN TYPE. SUCH A CRAFT WILL ACCOMMODATE A PARTY OF FOUR, AND MAY BE HAD FOR ABOUT $1,800.

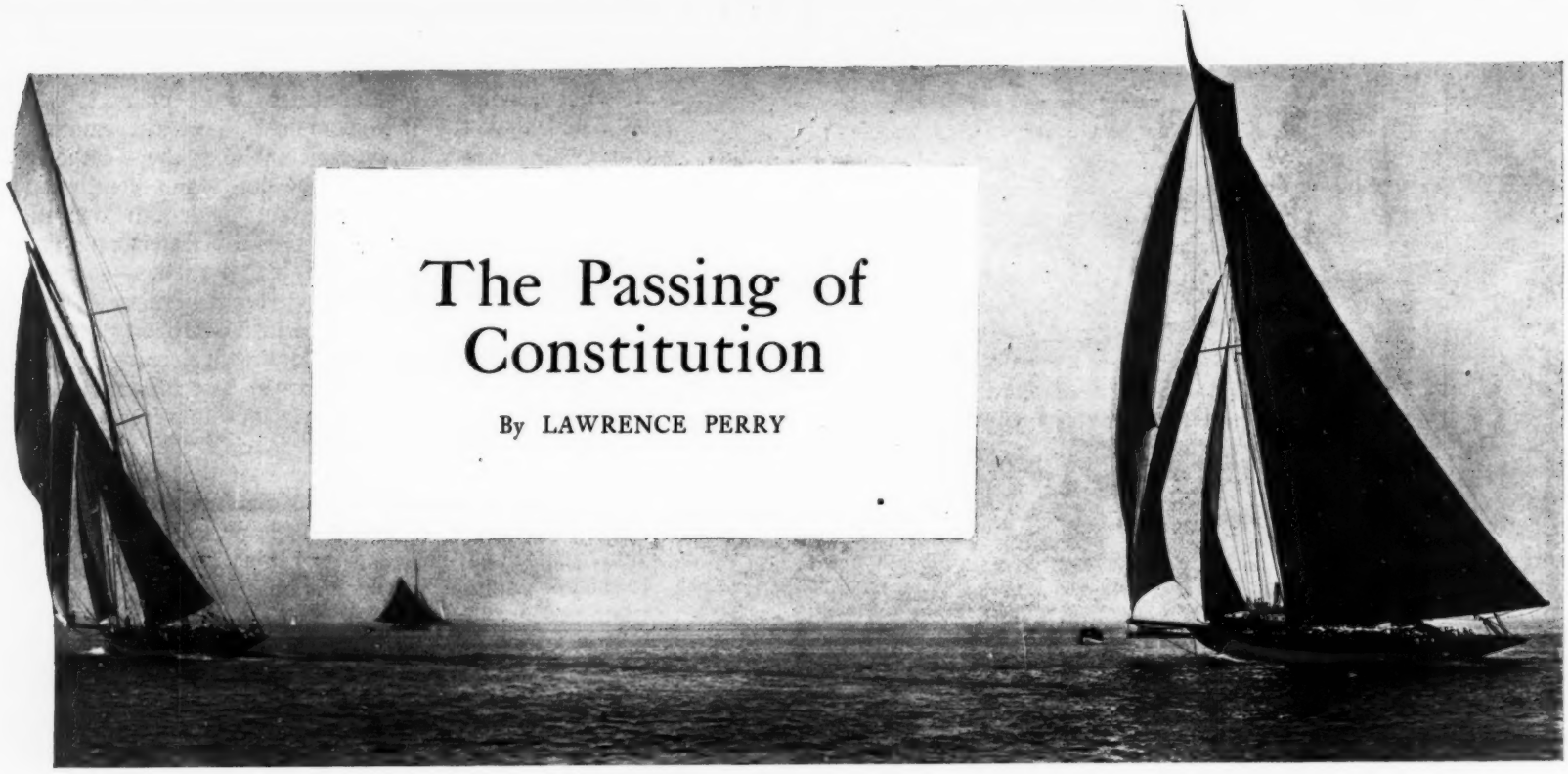
galley to allow of its being turned in starting. This engine, by the way, is a three-cylinder, 17 horsepower, with reverse clutch and control brought up to the steering wheel, which is on the port side of the after cabin bulkhead. Two forty-gallon gasolene tanks are under the flooring of the self-bailing cockpit, one on each side of the engine—a very good arrangement, as it places this variable weight further forward than is always possible in this style of craft. With the exception of a broad lazy-back stern seat running across its after end, the cockpit is left free for chairs. There is a watertank forward with connections to galley, and the boat's outfit includes an ice-box, stove, cushions and everything necessary for cruising, including an awning over the cockpit, and an 8-foot, 50-pound tender. She is 31 feet in length, 8 feet of beam, draws 2 feet 9 inches of water, and is an excellent sea boat. If desired, the after end of the cockpit can be made round instead of square, and fitted with a semi-circular seat. The boat can sleep five people comfortably, while two or three more could be easily crowded into her for a night.

A more ambitious and more expensive craft, yet one which comes sufficiently within the $2,000 cost to allow of its being included in this article, is the 36-foot "V" stern cruiser, whose plans are shown herewith. By reference to these plans, it will be noted that she is a combination of the hunting trunk and glass-cabin types, combining the weatherly qualities of the first with the light and ventilation of the second. She is 36 feet in length overall, 9 feet of beam, draws 30 inches of water, and has a headroom throughout of 6 feet 3 inches—a thing which makes for comfort on an extended cruise. There are two cabins forward, one of which is properly a stateroom, while the other is the saloon with sleeping accommodations for two. She has a 5½-foot forward deck, directly aft of which is the forward cabin 6 feet 3 inches in length, containing transom berths on each side, coming together at the forward end of the cockpit, with just enough standing room for comfort between them at their after end. The main cabin or saloon has extension berths at each side. Aft of this a central door leads to the companionway, which is in the center of the after cabin bulkhead. On the port side of this is the galley, with stove platform, locker and ice-box, and on the starboard side a lavatory. The two-cylinder, 2-cycle 15-horsepower reversible engine is under a raised hatch at the forward end of the cockpit. The steering wheel and control are to port of the engine, against the after-cabin bulkhead. The cockpit is square at the after end, with lazy-back seat across the full width. The amount of light and ventilation furnished makes this boat particularly adapted to Southern cruising.



PLANS OF A DOUBLE STATEROOM CRUISER THAT COMES JUST UNDER THE $2,000 LIMIT. THE ENGINE ROOM IS ELIMINATED BY PLACING MOTOR UNDER COCKPIT FLOOR.

IN A LONG DAY'S RUN ONE IS NOT DEPENDENT ON DAVITS TO TAKE CARE OF THE TROUBLESOME DINGHY.



The Passing of Constitution

By LAWRENCE PERRY

CONSTITUTION LEADING COLUMBIA ON THE NEW YORK YACHT CLUB CRUISE. IN LIGHT AIRS THE FORMER WAS A VERITABLE GHOST, AND HAD NO TROUBLE IN WINNING HANDILY.

THOUGH BUT EIGHT YEARS OLD, THE FAMOUS RACER IS TO BE BROKEN UP. BUILT TO DEFEND THE AMERICA'S CUP, SHE COULD NOT QUALIFY, BEING BEATEN BY AN OLDER BOAT. IN COMMISSION BUT TWO SHORT SEASONS

THEY say the sloop Constitution is going to the bone-yard; that within a few months one of the most graceful and beautiful examples of man's handiwork will be set upon by strong men with hammers and resolved into its constituent elements, which are bronze of exceeding value, and steel and lead and wood.

Well, she was unsuccessful. What stronger indictment could be framed against man or boat? She did not win. Built to defend the America's Cup against Shamrock II, she failed to qualify for the proud title, and so they are going to make an end to her. It is all right, of course, and yet those who love to think that yachts develop personalities—and what true yachtsman does not?—will recall certain flashing scenes of a summer gone, certain impressions of power and beauty and action, and will bestow more than casual regret upon the passing of that stately single-sticker with which these scenes are associated.

With the good old Defender, Constitution will go down in nautical history as among the unluckiest of yachts. Everyone whose memory goes back a few years will recall the miserable fiasco which ended the races between Defender and Valkyrie III so abruptly; everyone remembers the former's final trip to the junk pile, when she broke all records in the run from New London to City Island, ending her days as a soldier ends a life of gallantry, in the van of a forlorn hope.

So with Constitution; only in her case memory will bring forth no picture of a stirring day off the old red Sandy Hook lightship in competition against a proud yacht flying the ensign of a foreign nation. There was that to assuage the bitterness of Defender's loss—we were assured that her place in history would remain, whatever became of her.

It is different with Constitution. She failed not only of attaining the object for which she was built—the defense of the cup—she failed of convincing the defending club that she was worthy to defend it; and Columbia, successful defender of 1899, sailed in her place. Therefore, it is not to be regarded as likely that her name will long survive her hull.

For all that, she was a great boat—a "grand, good boat," to borrow an equine term—and that, at the final reckoning, the balance turned against her was through no fault of hers. Just where the fault lay has been a matter of debate—and always will be if, haply, the matter in years to come be deemed worthy of argument—but the kindest thing to say is that the sloop's misfortunes were due to combinations of circumstances over which those associated with her had but nominal control.

In the months following her retirement in favor of Columbia there was brave talk of holding her back until another year, and then preparing her to meet some challenger of the future. But when the next challenge came it was not Constitution which went forth to meet Shamrock III, but Reliance. That, of course, ended her. Reliance was so much swifter, so much more powerful, than all previous sloops from the Herreshoff yards as to relegate them, with swiftness and aplomb, to the limbo of things that once were.

No boat was ever ushered into salt water with more confidence than Constitution. When Sir Thomas Lipton sent his second challenge the New York Yacht Club, in all its arrogance of wealth, hooted down the suggestion of sending Columbia to the line once more. A syndicate, consisting of August Belmont, James Stillman, Oliver H. Payne, F. G. Boune, Henry Walters and W. B. Duncan, Jr., placed an order with the Herreshoffs for a new defender, and work began forthwith.

There was, of course, all sorts of talk regarding new ideas to be embodied in her hull; and, as a matter of fact, not a few ideas were embodied. Through a system of longitudinal framing her hull was rendered considerably lighter than that of Columbia. About the same length on the waterline, she had a foot more beam, and her mast was nearly 15 feet higher than Columbia's stick, consequently she spread 14,460 square feet of sail, as against 13,125 feet spread by the older boat.

The shape of the stern, as its overhang dropped from the sternboard to the waterline, was more abrupt than in the '99 defender, her quarters were heavier and bilges harder. In other words, she was not the sweet, well-turned boat that Columbia was; but her lines gave every indication of sail-carrying power and of speed.

The launching took place at 8.30 o'clock on the night of May 6, 1901. Every effort that would make for secrecy or develop mystery in regard to the craft had been exerted in the months she was building. No deviation was observed when she went overboard. The night launching was due to fear that some rival designer might count the rivets or obtain some other point of knowledge calculated to dethrone the British shipbuilders from their happy monopoly of yacht constructors plenipotentiary, not to say extraordinary, to their royal highnesses, the members of the New York Yacht Club. Had it not been for the intercession of W. B. Duncan, Jr., the sailing manager of the new defender-to-be, no scribes would have been permitted to witness the launching. As it was, they were quartered upon a tug some distance remote from the ways.

IN SMOOTH WATER ON LONG ISLAND SOUND CONSTITUTION WAS AT HER BEST.

It was a scene more weird than inspiring, that launching. The doors of the great shed creaked open and the stern of the sloop loomed ghostly. A few electric lights glowed from attending craft, and then, ever so slowly, the new flyer was lowered down the ways by cables. There was no glad, strong rush, such as one saw when Vigilant, Defender and Columbia swept down the ways to their natural element. Quite the contrary. And in that deliberate dip into the waters of Narragansett Bay those who were of superstitious turn of mind read ultimate failure. She began slowly, they argued; how will she end?

But the genius of Herreshoff was too bright that night to give much encouragement to such pessimistic mutterings. They were as prophets crying alone in the wilderness; and yet, as history proved, they were not the first prophets who had cried alone what ultimately proved to be great truths. The next morning two daring photographers attempted to take photographs of the new sloop. They were detected by Captain "Nat" Herreshoff, who assailed them physically, and afterwards locked one of them up in his shop while debating whether to cut his throat and lower him clandestinely into the waters of the bay, or break him on a wheel, or turn him over to the police. Ultimately he decided in favor of the less barbarous course.

From all this it will be gathered that Constitution, in these merry days, was not a little in the public eye. She continued to engage attention while the riggers went aft and prepared her for her maiden spin. This she made on May 20. She did not point very well, because of ill-fitting canvas; but otherwise she covered the water in breezy style. Yet, if anyone on that twentieth day of May had informed anyone else that that very matter of ill-fitting sails would largely contribute to her discomfiture in the final test, he would have been laughed at. And justly, because wrinkled canvas is, in the nature of things, an ailment which yachts, when skillfully managed, seldom die of.

Be that as it may, wrinkled canvas hampered Constitution on her trial spin. But, as Mr. Duncan, her manager, said he was satisfied, all things considered, no other person saw any reason why he should not be satisfied, too.

Capt. Uriah Rhodes, an old and tried skipper, was the sailing master of the vessel, and her crew were from the famous Deer Island section of Maine—brawny men all, and as good sailors as ever walked a deck. There had been some surprise manifested that Mr. Duncan had not chosen Charles Barr to sail his sloop. Barr had brought Columbia to victory in the '99 races against Shamrock I, and was as familiar with the Sandy Hook course as any captain afloat. But Mr. Duncan, probably from patriotic reasons, and because he knew Capt. Rhodes to be an efficient sail-cracker, did not engage the gloomy Barr.

Columbia was placed in commission that year to serve as a trial horse for Constitution. And yet, there is a sneaking notion that the owners of this boat had an idea that, with Barr at her helm and a tried crew of "Scowegians" forward, Columbia might well prove more than a trial horse to any yacht then afloat. If such notion there was, it proved not unfounded.

In the early races on the Sound Constitution won some, but not all of her contests with Columbia. That she did not show convincing superiority over the older craft was explained upon the ground that she had not yet been tuned up and sweetened. The trouble with her canvas still persisted, and then, too, she developed a most extraordinary horror of wholesail breezes and a bobble of sea. But still, of course, there was no doubt that she would ultimately round to and do all that was expected of her.

Let us see how she fulfilled expectations, first remarking that strenuous efforts to get her into some sort of speeding trim occupied days and nights of physical endeavor and mental exertion from early June until early July, at which time she was scheduled to meet, off Newport, Columbia and the new Lawson hooker Independence, designed by Crowninshield, and regarded by patriotic Bostonians as the swiftest craft that ever slid down the ways.

The first race was on July 6, and with a light wind—the new sloop had already proved herself a veritable ghost in catspaw zephyrs or Irishman's hurricanes—she won quite handily, defeating Columbia by 9 minutes and 49 seconds. Independence did not finish at all, at least not within the time limit set.

On July 8 there was another light breeze blowing off the Brenton Reef Lightship, and this, with a lumpy sea, made the going bad for all the racers. Constitution again prevailed, this time over a 30-mile triangle, defeating Columbia by more than half an hour and Independence by more than an hour. But that was about all, to fall into the vernacular. On July 11 the wind was a bit better, and Columbia won out over a windward and leeward course by nearly four minutes. The next day Columbia again won, by which time eyes of suspicion began to be directed at this latest Herreshoff wonder.

The chief difficulty seemed to be an inability to obtain all the power that should have been obtained from her great spread of canvas. In light breezes she sifted along finely; but come anything

over ten knots, and Charley Barr and his Columbia sailed rings around her. In the interest of better work her canvas was repeatedly changed, and by the time of the annual cruise of the New York Yacht Club it was supposed that she was on the way to better things.

The first day's run from Glen Cove to Huntington was characterized by light winds, and Constitution maintained her reputation by winning handily. The next day's run, from Huntington to Morris Cove, was also a drifting match, and Constitution again triumphed. She repeated next day, conditions similar, in the run from Morris Cove to New London; but in the run to Newport, which was characterized by good sailing winds, Columbia beat her all day on every point of sailing. The finish of that race was memorable—memorable because of the silence with which it was received.

The twilight had come and about twelve of the cruising steam yachts of the club lay off the Brenton's Reef Lightship to see the finish. Two towering jack-yarders were made out beyond Point Judith, and every eye strained to see which was the leading boat. Finally, as the leading yacht drew nearer, it was seen that she had not the double-spreaders of the Constitution. Silently she swept on, and, as she passed the committee boat, a solitary toot escaped from the whistle of that craft. There was no other sound, and Columbia swept towards the harbor, unheralded and unsung.

Then while Shamrock II was tuning up off Sandy Hook, Columbia and Constitution met in the trial races to select a defender to meet her. Columbia's success was maintained, and on the night of September 4 the cup challenge committee met at the New York Yacht Club station at Newport to award the honor. There were present Commodore Lewis Cass Ledyard, Rear-Commodore Robinson, E. M. Brown, C. Oliver Iselin, Archibald Rogers, J. V. S. Oddie and J. Malcolm Forbes.

The meeting lasted far into the night, and the discussion waxed warm. Nothing definite could be decided upon, and the meeting adjourned until the next day. Then, while the country waited, the committee unanimously voted to name Columbia as the sloop to meet the new Lipton challenger. It was a risky decision, but it was the only decision that could justifiably have been made.

As to the manner in which Columbia was sailed against Constitution, little need be said, although a great deal was said at the time. Barr sailed Columbia to win, and when a skipper goes in to win he goes in for blood, and anyone who expects a professional racing skipper to practice the Golden Rule upon all occasions will speedily come to realize that he is taking a too optimistic view of the inclinations and ethics of the guild. There were times when Columbia jammed Constitution into all sorts of unsportsmanlike corners; but if Rhodes had been allowed more scope in the matter of taking risks, or holding steadfastly to his rights, he would have accomplished one of three things—he would have won, he would have been sunk, or he would have sunk Columbia.

When Reliance was built to defend the cup against Shamrock III both Columbia and Constitution were placed in commission as trial horses. After several races, in which Reliance demonstrated her superiority in light airs, and Columbia repeated her triumphs over Constitution, the trio went down to Sandy Hook, where Reliance again won. But on the annual cruise of the New York Yacht Club, Constitution handily defeated Reliance in the port-to-port run from Glen Cove to Morris Cove. She also won the run from New London to Newport on time allowance. These races seemed to justify, in some measure, the words of those experts who had all along proclaimed that Constitution's only defect was lack of proper tuning-up.

Her end drew near about a month ago, when she was sold to a New York firm, which, it is said, will break her up for junk, the total value of which is estimated at about $25,000. She cost fully $250,000 to build and fit.

The Handicap Class of Long Island Sound in 1908

By L. DE B. HANDLEY

SINCE the inception of boat racing in this country, nothing has proved more beneficial to the yachtsman of moderate means—and he is in the majority—than the formation of the handicap yacht-racing class of Long Island Sound. Its rapid development and the great success it had during the last season speak volumes in its favor, for its popularity was not great at the start. It was, in fact, conceived in an atmosphere of antagonism, born under most adverse circumstances and reared in doubt and uncertainty. Yachtsmen looked at it askance, for the general feeling at first was that to wear the % sign was to declare one's self among the fallen. Views have changed since then. The idea which was responsible for the formation of the handicap class was a good one and was bound to triumph in the long run. Slowly the prejudice disappeared, as owners and yacht clubs began to realize the benefits to be derived from it, and it grew apace. Thirty-five boats competed under its colors during the past season and furnished some of the best racing of the year.

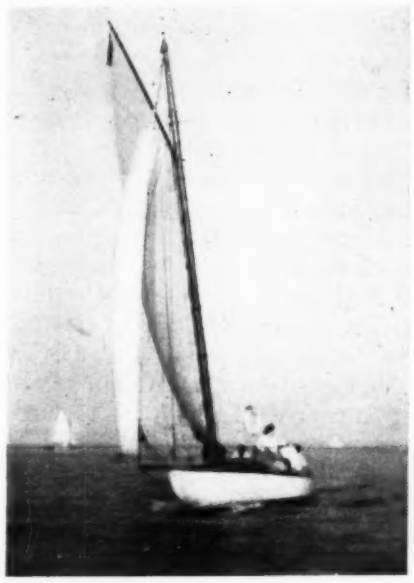
Among the owners of small boats are the true lovers of yacht racing—the men who handle their own boats and never miss a regatta, week in and week out. Unfortunately many of them are not able to build as frequently as the rule changes, and the advent of unusually successful boats make it necessary, and they find themselves with practically new boats on their hands, which are either outclassed by measuring reforms, or just unable to win. Without the handicap class they would have to give up racing: in its ranks they find excellent competition under conditions that tend constantly to equalize, mathematically, any difference between boats on a percentage allowance basis.

GEORGE P. GRANBERRY, PRESIDENT OF HANDICAP CLASS, AND LARGELY INSTRUMENAL IN ITS FORMATION.

When the class was first organized, the

boats were handicapped according to their known performances or estimated speed, and they all started together, but as the membership grew and craft of every type and size were taken in, the advisability of forming more than one division became evident. Two sections were then made, the boats being grouped on their speed, and later a third and fourth sections were added. The raceabouts, because of their great number and similarity of build, were given a special division, the second. Of the four divisions the number was cut down to four. The fewer taken, the swifter and greater the fluctuation of the handicaps, and the better each one's chance for the plate.

A feature of the handicapping that met some criticism, was the ten per cent. limit of allowance. Particularly in a one-design class like the raceabout, such a margin is too great, and a reduction to eight, or even six, per cent. seems advisable. If a boat is unable to win with this handicap, she can be transferred to a slower division and the reduction will work no hardship on her; but with boats of practically the same speed, a ten per cent. limit offers too great an opportunity for trickery. Suppose a yachtsman should buy a second-hand boat at the beginning of the season, or put his own in commission with old sails and unscraped bottom, thus reaching, in a few races, the limit of allowance. Then say he changes to new or better sails, has the boat hauled and cleaned and comes out to race again, probably minutes faster. He simply has the class at his mercy, for there is no penalty for new sails if the area is not increased, and if he wins, judiciously, by small margins, killing the boat when he has the race won, it will probably take the entire season to bring him down to his proper level. Nor is



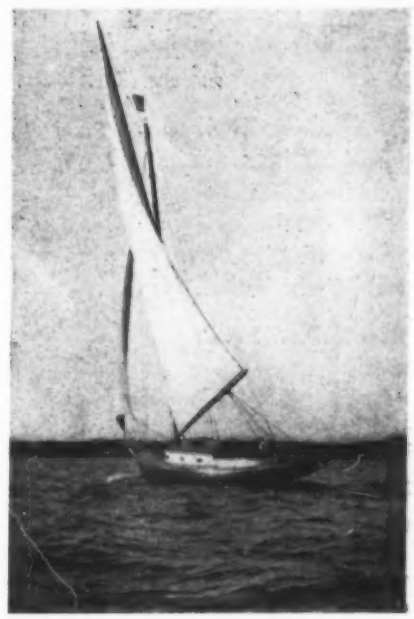
BUSY BEE, RACEABOUT DIVISION. JUANITA. SHE SCORED THE MOST POINTS IN SECTION B, FIRST DIVISION.

OKEE, A FOURTH DIVISION BOAT, TWICE WINNER OF THE BLOCK ISLAND RACE.

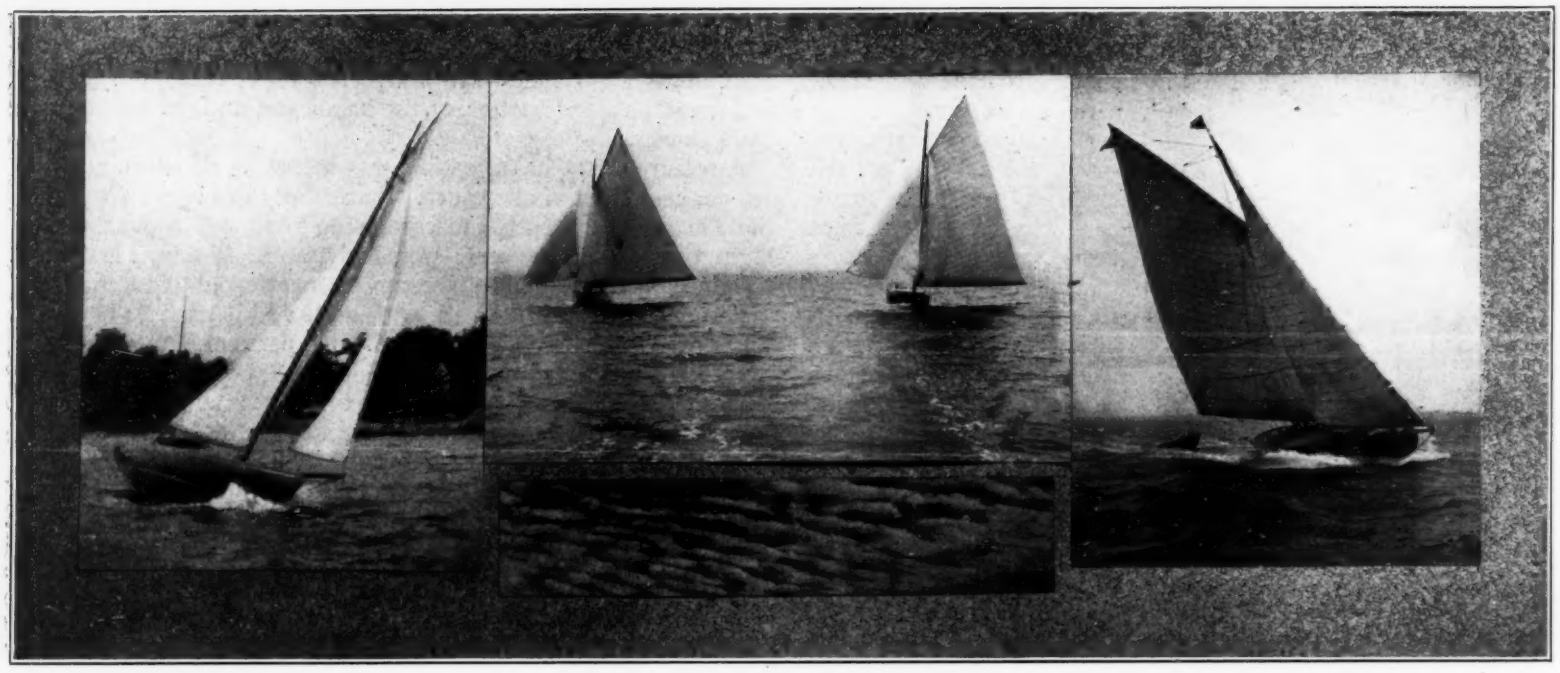
which raced in 1908, the first contained several large, able cruisers and a few racing boats of quite recent vintage; the second was made up entirely of raceabouts; the third had in it principally outclassed racers of from twenty to twenty-five-foot rating; and the fourth held mainly eighteen-footers. Before the season had been under way long, it became evident that the first division had outgrown itself, and the admission to membership of a couple of unusually fast boats was made a pretext to subdivide it into two sections, A and B. The only fault to be found with the grouping, was the overlooking of size and type and classing only on speed. This brought together, in section A, the big ocean-going yawl Hyperion and the class Q racing machine Sally IX, an incongruous coupling that it would have been just as well to have avoided.

The system of handicapping used in 1908 was slightly different from that of previous years and an improvement on it. In calculating allowances, the original method was to allot to each boat an estimated percentage for the first race, and thereafter to calculate it mathematically on actual performances, averaging them all up each time. Later it was found more simple and satisfactory to take only the last five races instead of all, and this year the supposition an idle one; the trick was attempted, and only a series of unusual circumstances prevented its being successful.

There has also been some grumbling on the part of certain owners of first-division boats, because the same percentage allowed in sailing the triangle was enforced in the long-distance races. These men claim that in prevailing Sound weather—light breezes alternating with flat calms—the allowance favors the smaller boats too much and should be cut down at least fifteen per cent. They point out that in the New



TILLICUM II, A THIRD DIVISION BOAT. HARRY JACKSON JR'S CONSISTENT PERFORMER, MIST.



RASCAL, A CLEAN-LINED RACEABOUT. A NECK AND NECK FINISH UNDER SPINNAKERS. GEORGE P. GRANBERRY'S TANYA.

York Athletic Club race to Block Island, and in both the Manhasset Yacht Club and Harlem Yacht Club race around Stratford Light—the three classic small-boat events of the season—there were, at first, hours of breathless atmosphere, during which the larger boats were allowing time, although they were not moving, and then fair winds, under which the races were finished without giving these larger boats a chance to make up the early losses.

These facts are unquestionable, but in dealing with yacht racing all kinds of weather must be taken into consideration. Last year the cruising events happened to meet with light winds, but what of previous races, held in storms, gales, rough water and headwinds? How about the small boats then? What chance would such craft as Busy Bee, Miss Modesty, Arrow and the like stand of winning the Block Island race from Tanya, Hyperion and such boats in an easterly blow? Easterly blows are rather frequent during the summer. Should the possibilities of bad weather not be considered at all?

The new rule, decreeing that when a boat was beaten more than twelve per cent. she should only be rated at this figure, proved a wise one. At one of the Seawanhaka Yacht Club regattas the leading boat in one of the classes broke down, but decided to finish and crawled in long after everyone else had crossed the line. Had not the twelve per cent. rule existed, she would have obtained at one leap the ten per cent. limit of allowance, not because she had demonstrated lack of speed, but through an accident. As there is nothing to prevent the unscrupulous from breaking down purposely and so having a thirty or forty per cent. defeat jump them suddenly to where they cannot lose, it was well that the rule was formulated before the temptation became too strong. One of the good results of the association is the friendly spirit engendered, which is manifested in the way in which it is conducted. Those at the head of the association are themselves racing members of the fleet, and are men who hold the pleasure of sportsmanlike

(Continued on page 146.)

	New Rochelle, May 23.	Harlem, May 30.	Knickerbocker, June 6.	Manhasset Bay, June 13.	Larchmont, June 20.	N. Y. A. C. Cr'ng., June 20.	New Rochelle, June 27.	Seawanhaka, June 27.	American, July 3.	Larchmont, July 4.	Riverside, July 11.	Larchmont, July 18.	Larchmont, July 20.	Larchmont, July 22.	Larchmont, July 23.	Larchmont, July 24.	Larchmont, July 25.	Indian Harbor, August 1.	Horseshoe Har., August 8.	Huguenot, August 15.	Harlem Cr'ng., August 15.	Manhasset Cr'ng., August 22.	American, August 29.	Seawanhaka, September 5.	Larchmont, September 7.	Handicap Class, September 12.	Manhasset Bay, September 19.	Number of Sts.	Places Won, First.	Places Won, Second.	Places Won, Third.	Points.
1st Division—Class A.																																
*Sally IX	..	..	..	..	..	1	..	3	..	..	..	2	3	1	2	1	1	0	..	..	..	3	..	2	1	1	3	13	5	3	4	37
Marguerite	..	..	..	..	1	0	..	1	..	1	0	3	1	2	1	3	3	..	..	..	..	..	2	1	..	..	..	13	6	2	3	36
*Trixie	..	..	..	..	..	..	..	..	..	0	..	1	2	3	3	2	2	..	2	2	2	..	..	..	..	..	..	10	1	6	2	26
*Bobtail	..	..	..	..	..	0	..	..	..	..	..	..	..	..	..	..	..	3	1	1	3	0	1	0	3	2	2	11	3	2	3	24
Alert	..	..	..	..	..	..	..	..	..	2	0	0	..	0	..	..	..	1	..	3	..	..	..	3	2	..	1	9	2	2	2	18
*Duchess	..	..	1	2	..	0	0	..	..	..	..	..	..	..	..	0	0	0	..	..	..	..	..	..	..	3	..	8	1	1	1	9
*Hyperion	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0	..	2	1	0	0	4
Class B.																																
*Juanita	..	..	3	..	..	0	1	..	..	3	..	1	2	1	0	1	0	..	..	1	0	2	1	1	1	2	1	18	9	3	2	63
*Fearless	3	..	1	2	0	0	0	..	2	3	..	0	3	2	3	1	2	1	..	..	..	..	2	2	..	3	..	18	3	6	5	54
Tanya	2	..	..	..	..	..	..	..	..	..	..	1	2	1	1	2	0	2	..	..	..	3	3	3	2	1	2	14	4	6	3	53
*Redwing	..	..	..	..	..	0	..	..	..	..	..	..	1	..	2	3	1	..	..	..	..	..	..	..	..	..	..	5	2	1	1	17
*Bedouin	..	1	2	..	..	0	0	..	..	0	..	..	..	..	..	..	..	..	..	..	0	..	..	..	..	0	..	7	1	1	0	9
*Lorelei	..	..	3	..	0	..	..	..	..	0	..	..	..	..	..	..	3	..	..	..	..	..	..	..	..	..	..	4	0	0	2	6
Thelema	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	0	0	5
2d Division.																																
Rascal	1	..	..	..	1	..	2	..	1	2	..	2	3	1	2	2	3	..	2	1	..	..	3	..	3	1	1	17	7	6	4	71
Jolly Roger	..	..	1	..	..	..	..	..	3	0	0	0	0	0	1	1	1	2	1	2	..	..	1	2	1	2	..	17	7	4	1	54
Jolly Tar	..	..	..	1	..	0	1	..	..	0	..	0	1	3	0	3	0	..	3	3	..	..	2	..	2	3	2	16	3	3	5	42
Busy Bee	..	..	0	0	0	0	..	1	0	1	1	1	2	2	3	0	0	1	..	..	..	..	0	..	..	..	..	13	5	2	1	36
*Psammiad	2	..	2	2	3	..	..	2	2	..	0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	7	0	5	1	23
Howdy	..	..	3	3	2	..	..	..	2	0	..	3	0	0	0	..	2	..	..	..	..	..	..	..	..	..	..	10	0	3	3	21
Scamp	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	0	..	..	..	..	..	..	..	2	1	0	0	5
3d Division.																																
Kenosha I	3	..	1	2	2	0	2	..	..	..	..	..	0	2	1	0	0	..	1	2	..	..	..	1	2	1	1	17	6	6	1	57
Mist	1	1	0	..	..	3	0	..	..	1	..	2	..	..	..	..	3	..	..	..	1	1	..	..	1	2	..	12	6	2	2	44
Kenosha II	2	..	0	1	1	..	0	..	..	..	..	0	1	0	2	2	1	..	2	0	..	..	..	..	..	0	..	14	4	4	0	36
Grace II	..	..	..	..	..	2	0	..	..	2	..	3	3	3	3	3	2	..	..	0	..	..	1	..	..	0	..	12	1	3	5	32
Tamerlane	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	0	0	5
*Tillicum II	..	..	0	..	..	0	0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	..	4	0	0	1	3
4th Division.																																
Miss Modesty	..	..	2	1	..	..	2	..	2	3	..	0	0	2	3	1	1	..	1	3	..	..	2	..	2	0	..	13	4	6	3	66
Okee	..	..	..	2	..	0	0	..	1	1	1	0	3	0	0	3	3	..	2	..	..	..	1	1	..	..	1	16	6	2	3	58
Bat	..	..	..	..	1	..	1	..	..	..	..	1	2	1	2	0	0	..	..	..	..	..	..	..	..	..	..	8	4	2	0	34
Arrow	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	2	1	1	2	5	2	2	1	26
*Sally VIII	..	..	..	..	..	..	..	..	..	..	..	3	0	0	0	2	2	..	..	..	..	..	0	3	3	..	..	9	0	2	3	22
*Mouse	..	..	..	..	..	..	..	..	..	2	..	0	1	3	0	0	0	..	..	..	..	..	..	..	..	..	..	7	1	1	1	15
*Answer	..	..	..	..	..	..	..	..	..	..	..	2	0	0	1	..	0	..	..	..	..	..	..	..	..	..	..	5	1	1	0	11

* Boats marked with an asterisk were added to the class during the season of 1908.

Signaling Devices for Motor Boats

By HARRY WILKIN PERRY

IT is, of course, practically impossible for the United States to police the navigable waterways under its jurisdiction as thoroughly as the land highways are watched by the patrols hired by every city and village. It is probably owing to a recognition of this inability of the boat inspectors and harbor police to cope with the thousands of small pleasure craft that no such explicit laws have been enacted by the government to regulate the use of small power boats as have been passed by the various State legislatures to limit the speed and govern the numbering, lighting and the signaling devices of automobiles. About the only laws applying to motor boats of less than fifteen tons burden and used for pleasure purposes are statutes enacted for steamboats and power vessels for hire or engaged in passenger service. Consequently there is much confusion in the public mind and in the minds of the designated authorities regarding the precise requirements with which the owner of a small pleasure boat should comply in the matter of equipment.

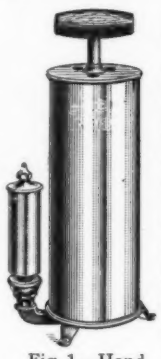


Fig. 1.—Hand whistle, operated by making a stroke with the handle, which forces air through the whistle.

The law does not require any licensed officer on any pleasure motor vessel, no matter how large she may be, yet more than 3,000 licenses have been issued in the Second District, which embraces the waters of the Atlantic coast, rivers and tributaries between the Bay of Passamaquoddy, at the northeastern extremity of Maine, and Cape Charles, at the entrance to Chesapeake Bay. These licenses permit their holders to hire their boats out for excursions on holidays and Sundays without violating the federal law.

In this large district there are only seventy inspectors and thirty assistants, although about 300,000,000 passengers are carried annually by the steamers that report to the office of the supervising inspector for the district. The thirty assistant inspectors were detailed for service at the port of New York by the surveyor of the port and their tugboat Dalzelline was very active last year in pursuing and inspecting power boats that were obviously engaged in carrying passengers for pay. While these assistant inspectors have no authority over small craft used by amateur launchmen or yachtsmen, every such owner should, if for no better reason than the selfish one of self-preservation, take the precaution to provide his craft with all the equipment necessary to comply with the regulations applying to larger boats.

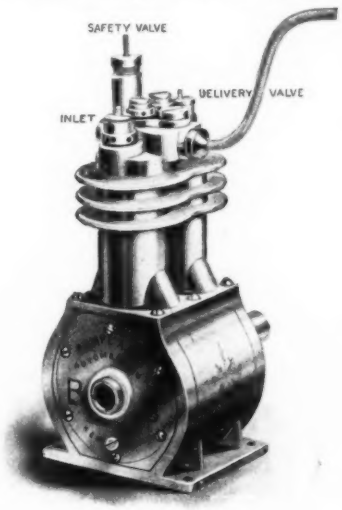


Fig. 2.—Air Pump for charging pressure tank. The safety valve is adjusted to "blow off" when the maximum pressure desired is reached in tank. This outfit should not be used with an engine under 5 H. P.

WHAT THE LAW REQUIRES

The supervisor of steam vessels holds that "under the Pilot Rules all steam vessels or vessels propelled by machinery are required to carry a red light; a green light; a white light, and a white lantern; one fog horn; one fog bell, to be not less than six inches across the mouth, and one whistle, to be blown by compressed air or some mechanical means."

As the word "whistle" does not appear to be defined, almost any sort of sound-producing device that can be heard a long distance, and more particularly that can be readily manipulated to give the necessary successive and distinct blasts used in signaling the intentions of the steersman to the pilots of other craft, will pass muster should an inspector or assistant inspector take a look at the boat.

For use in fogs both the horn and bell are required. Since the size or nature of the horn is not specified, all that is needed is a twenty-five cent tin horn. According to the pilot rules, all craft except steam vessels, sailing vessels and vessels towed, which are otherwise provided for, "shall sound a blast of the fog horn or equivalent signal." It has not been settled by the courts what constitutes an "equivalent signal," but it has been held by the supervising inspector for the second district that on pleasure motor craft the automobile whistle or horn, in which the blast is given by squeezing a rubber bulb, would comply with the law. There is no apparent reason, therefore, why the same device may not in many cases serve both for whistle and horn.

Fig. 3.—Single-tube chime, or "Gabriel Horn," which operates on the same principle as an organ reed.

The purpose of the fog bell is to be heard a sufficient distance to enable a steamer to clear the anchored craft, and the rules of the board of supervising inspectors require that it shall be "constructed of bronze or brass or other material equal thereto in tone and volume of sound."

Fig. 3a.—Cut-out valve by which the spent gas is diverted from exhaust and passed through whistle or horn.

Passenger boats are required to have a mechanical whistle, and the inspectors advocate the use on such small craft of a whistle blown by compressed air contained in a tank and released by a lever.

HAND-OPERATED WHISTLES

Probably the type of whistle most commonly in use on small motor craft, because it is inexpensive and answers the purpose very well, is the hand-operated outfit, which consists of a small whistle attached to a heavy brass pump. These are made in various sizes and styles. That shown in Fig. 1 is typical. The pump cylinder is four inches in diameter and eleven inches long and is fitted with a heavy cast brass base with legs or feet by which it can be screwed to the deck or floor, a cast brass cap, 1½-inch whistle and polished wood handle, with suitable plunger and plunger rod. A quick downward thrust on the handle compresses the air in the pump and gives a sharp blast of the whistle, which can be made short or prolonged until all of the air in the pump has been forced out. The whistle may be either a single-tone whistle or a chime of two or more in harmonious keys. They are made in sizes from 1⅜ inches to 3 inches in diameter for use with pumps 3 x 11 to 5 x 18 inches in size. In some models the pump is constructed so that it may be secured in a horizontal position just beneath the bow deck, with

Fig. 4.—Hand-power siren. The revolution of the hand wheel creates a centrifugal air current that passes through openings alternately opened and closed.

the whistle rising above. In this position the handle is directly in front of the wheelsman.

COMPRESSED AIR WHISTLES

Single and chime whistles similar to those used with the outfits mentioned are fitted with valves and adjustable levers to be operated by a wire or cord. These are intended for use in connection with compressed air tanks, to which the whistle can be connected directly or by suitable piping that is concealed under the deck. They produce a deep, mellow sound that has great volume and carries a long distance. There are several ways of obtaining pressure in the tank. One is to install a small air compressor in the boat which can be driven by a belt, chain or gear from the engine or propeller shaft, or which can be turned with a crank by hand. These compressors are made in single and double cylinder patterns and are constructed on the lines of small gas engines, having vertical cylinders, reciprocating pistons, intake and outlet valves, and cylinder cooling flanges. Fig. 2 shows a twin cylinder pump, having a height of 11 inches, which can pump up to a pressure of 90 pounds to the square inch, and has a safety valve that can be set to open at any predetermined pressure. The pistons are 1⅜ inches in diameter and have a stroke of 3 inches. Complete, the pump weighs seven pounds. Air compressors are not recommended unless a boat is equipped with an engine of at least 5 horsepower.

Another means for securing pressure in the compressed air tank is by tapping the cylinder of the boat engine and piping the gas to the tank. Special apparatus is made for this purpose. It consists of a threaded connection for attaching to the priming cup or petcock opening, a priming cup to take the place of the one removed, a flanged cooling cylinder, a length of copper piping, a spark arrester and check valves to prevent the return of the gas when under pressure. The gas is taken from the engine on the explosion stroke when the pressure is greatest, and as the opening of the valve through which it passes is only 1/100 of an inch in size, the quantity that passes at each stroke is infinitesimal. When the tank becomes fully charged no more gas is taken until the pressure is lowered by sounding the whistle. The tanks are supplied in sizes from 10 to 12 inches in diameter and 20 to 48 inches long, of galvanized iron or seamless, drawn steel tubing. They can be placed out of sight under the seats or deck of the boat.

Fig. 6.—Electric whistle, which is sounded by rapid vibration of a diaphragm until it gets into resonance with outer shell.

EXHAUST-BLOWN WHISTLES

Various types of devices to be sounded by exhaust gas from the motor have been invented. The single-tone or chime whistles already mentioned can be attached to the exhaust pipe with a cut-out valve between, so that when the valve is opened by a light pull on a cord or lever attached to a wire the spent gases will be diverted through the whistle.

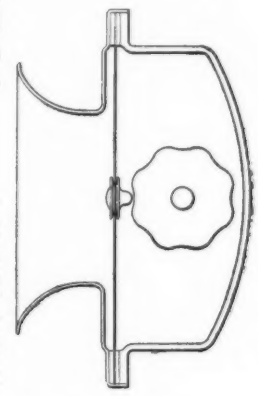
A company which has been very successful in the manufacture of exhaust horns for automobiles is now bringing out a small single-tube horn for boat use. This measures 1½ inches in diameter by 11 inches long, and the tube is divided internally to produce two distinct notes that will blend together in a pleasing chime. The form of this horn is shown in Fig. 3. A special cut-out valve (Fig. 3a), which has to be used with this horn, is set into the exhaust pipe as near the emission end as possible and the horn connected with one of the openings by means of an elbow and piece of gas pipe. The valve is kept closed by a small spiral spring until it is opened by a pull on a wire attached to the valve lever, which releases the gases.

A variation of the foregoing device has a plunger sliding in the barrel of the horn by which the tone can be made to ascend and descend the scale, producing a weird effect.

Fig. 5.—Electrically operated siren, which contains a small motor and takes current from the ignition battery.

HAND-OPERATED SIREN

Among the newer types of noise-producing devices is the siren. In its simplest form this is hand operated, as in Fig. 4. By means of multiplying gears, the hand crank rotates at high speed a light cast aluminum turbine or hollow fan wheel having openings in the periphery that coincide with similar openings in the circular casing within which the turbine fits closely, but without friction. The turbine is of such a shape that as it revolves it draws in air and forces it out through the openings, and as they are alternately opened and closed the air is set to vibrating in sound waves that become shorter and consequently higher in pitch as the speed of rotation increases. The sound can be heard for a distance of from one to three miles or more, according to conditions. The fan, or turbine, is mounted on ball bearings, so that a woman or child can operate the siren easily. An 8-inch brass bell is fitted to the mouth of the device to project the sound.



MECHANICALLY-OPERATED SIRENS

Sirens are also made to be sounded mechanically. The train of gears and crank handle are replaced by a flexible shaft directly connected to the turbine at one end and having a small pulley at the other. The pulley is journaled in an arm that is so mounted that the pulley can be brought into contact with the face of the flywheel momentarily by hand or foot and the motion of the wheel communicated to the siren. Such a siren serves admirably as a fog signal and produces a hair-raising shriek which begins with a low note and rises through the scale to an intensely shrill screech. It is not so well suited, however, to the production of the short, sharp blasts so much used in signaling to other boats.

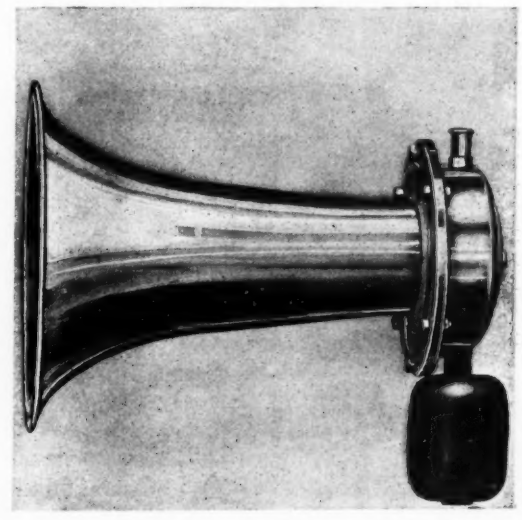


Fig. 7.—An electrically operated horn which produces a discordant note of great volume and carrying power. Also detail showing method of producing sound by means of vibration of a diaphragm caused by the revolution of the fluted-edge wheel.

ELECTRICALLY-OPERATED SIREN

The latest form of siren (Fig. 5) is operated by an electric current from the ignition battery. The turbine is mounted on the armature shaft of an electric motor, enclosed in a brass case sup-

(Continued on page 140.)

A TWIN-SCREW POWER TENDER FOR THE STEAM YACHT ATALANTA. EQUIPPED WITH TWO SIX-CYLINDER ENGINES, GIVING A SPEED OF 18 MILES, SHE IS QUITE A DEPARTURE FROM THE OLD GIG.

The Month in Yachting

I AM under the impression that a great majority of fair-minded racing yachtsmen throughout the country are not out of sympathy with the stand taken by the Royal Canadian Yacht Club, of Toronto, in regard to its challenge for a race for the Canada's Cup next summer. The challenge was sent in good faith; no one, of course, doubts that; but the thought furthest from the minds of our friends across the border was that the Rochester yachtsmen would attempt to secure Seneca for the international event. It will be remembered that Addison Hanan, who sailed her to victory against Adele in 1907, purchased the sloop after the races and brought her down to Long Island Sound. The first thought of the Rochester sailors, upon receipt of a new challenge a month or so ago, was to regain possession of the swift sloop. Seneca is a wonderful racing machine; she demonstrated this in her races for the Canada's Cup against Payne's creation, and last season she made still further demonstration in her races against Mimosa III and other crack Sound racers. But she does not conform to the new scantling and construction rules adopted at Toledo in 1907 and revised by the Lake Yacht Racing Association at its meeting in Chicago this year. Any new contender for the trophy won primarily by Canada and now in the possession of the Rochester Yacht Club would have to be constructed under these new rules. The stipulation in these rules that they are not to apply to boats built on or brought to the Great Lakes prior to their adoption, seems to admit of the entry of Seneca, if the letter of the rules alone be regarded. But a sportsmanlike interpretation of the rules, I should say, would most assuredly keep Seneca out. One thing is certain: any boat built under the rules which now obtain would have about as much chance of beating Seneca as a tugboat would have of showing a clean wake to Dixie II. The Canadian yachtsmen would have been throwing money away and wasting their time in entering into such a foolhardy venture. The object in Canada's Cup races, aside from the main desire to win the trophy, is the development of a certain type of boat; a sloop that is weatherly as well as fast. It is a question of extreme doubt whether Seneca ever met any of the rules governing these important international events. This is because, following usual custom, the Herreshoffs, designers of the sloop, refused to allow the plans to be seen. At the time the Toronto yachtsmen could have refused to enter the contest of 1907, and could have claimed the cup by default. But they refused to take advantage of technicalities and sailed the series. This is the sort of spirit that inspires the average follower of the sport.

TAMMANY—FLAGSHIP OF COMMODORE W. C. TOWEN, OF THE BROOKLYN YACHT CLUB, AND A CONTENDER IN MANY OCEAN RACES.

There would have been no trouble at all had the men who framed the revising regulations at the conference of the Yacht Racing Union of the Great Lakes taken Seneca into consideration. This they did not do, and refused to make a ruling on her eligibility or to interpret the ambiguous clause in dispute, as has already been told in these columns, holding that the matter was one for settlement between the two clubs. Seneca has been taken to salt water, it was supposed permanently, and until the question was raised at the conference there seemed no likelihood of her coming back. The recent misunderstanding is a striking demonstration that makers of rules and regulations who, through neglect or carelessness, leave loopholes, are liable to involve themselves and others in scalding water.

That was a snappy article in the London "Field" last month in regard to the attitude of the New York Yacht Club concerning the America's Cup. It was not so much what the "Field" said as the "nasty way he said it," to borrow a phrase once popular

in London music halls. As a matter of fact, the writer rehashes much that was said at the time of the turning down of Sir Thomas Lipton's challenge in not a few English and American periodicals, including YACHTING, the chief point being the refusal of the New York organization to accept a challenge for the cup under conditions which govern all other races in this country, i. e., the Uniform Rule. Still, "Field" has verbally refurbished the matter so that it sounds new, and certainly the American newspapers which reprinted it must have so regarded the article. Come to think of it, the English sporting journal did make one new point. "If Sir Thomas Lipton was good enough to race against three times, why not a fourth?" it asks. Certainly, why not? Judging from English conditions, it will be Sir Thomas Lipton or no one for the next score of years.

SENECA, THE CAUSE OF THE WITHDRAWAL OF THE CHALLENGE FOR THE CANADA'S CUP BY THE ROYAL CANADIAN YACHT CLUB.

Lipton, by the way, has offered the Corinthian Yacht Club, of Marblehead, a $1,000 cup, to encourage racing of yachts of the 27-rating class on the waters of Massachusetts Bay. Good for Sir Thomas! No pent-up Utica holds his powers of patronage.

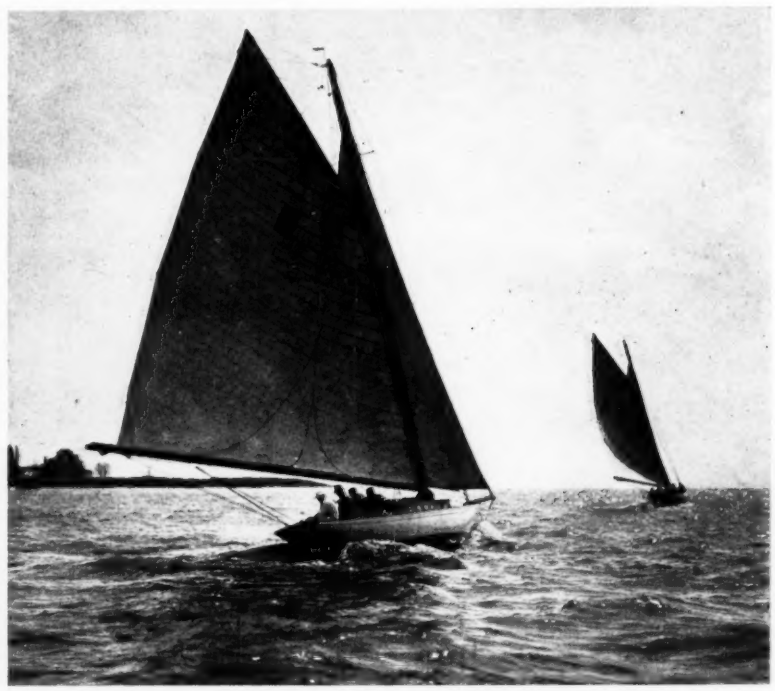
I am happy to be able to state that within a short time the Brooklyn Yacht Club will have a home more in keeping with the reputation of that organization as "the father of racing," as well as the second oldest yacht club in America. The club has purchased "West Lawn," one of the "show places" of the north shore of Gravesend Bay, and construction of a large club-house will shortly begin. A reproduction of the architect's drawing will give a better idea how the place will look when completed than I can. This progressive movement of the Brooklyn club will do much for yachting in New York waters. The club certainly is to be congratulated, not only upon acquiring their new quarters, but upon the energetic officers that head the organization.

A few weeks ago I visited several great yacht basins, where yachts of all sorts are laid up for the winter. There was no special object in the trip; there was nothing to be gained from it either in the way of new impressions or of information that might prove interesting to readers of this department of YACHTING. Yet it is a journey I always make along about late fall; just why, I confess I do not know, unless my motives be explained on grounds of sentiment. Yes, I guess it is sentiment. Shrouded in their canvas coverings, or hidden under pent houses, the yachts are far from the things of beauty they were on summer seas. Over yonder are a group of steam yachts, which when last seen were in Newport harbor, hulls spotless white, brass-work gleaming, and decks thronged with brilliant parties of guests. How far off that seemed from this place of marine hibernation! The great schooner Queen sent up her towering masts and spars into a cold sky, and the rigging rattled desolately in the wind. Up at City Island many of the fleet windjammers which carried off trophies in the summer gone were high in the air on stocks, wrapped in their canvas shrouds. Columbia and Reliance were there. It is some years now since they breasted salt water. Reliance, with her powerful lines, grimly suggests the rôle she has been playing for some time now—a deterrent to all who, were she not in existence, might be inclined to challenge for the America's Cup. Columbia, sweet of hull, as pretty a study in lines and curves as ever won a prize, is a decided contrast; but I venture to say her splendid record of successive America's Cup victories will keep her name alive long after Reliance is but a vague memory.

There are times when progress reveals itself in curious ways. It was the wreck of the American schooner John M. Brown just north of Hatteras last month which gave to us our first inkling of the extraordinary advance which the gasolene engine has made in a quarter hitherto unaccounted for.

And in the story of the wreck there is interest alike for those unimaginative persons who fancied they had traced the gasolene engine to its outermost posts of advance, had forecast the extremest possibilities of future applicability, or for those who, aside from anything pertaining to power, love a good salt sea yarn.

Here is the story of the loss of the John Brown, staunch fore-and-after, fifteen days out of Brunswick, Ga., with a cargo of pine. The vessel was then 300 miles east of Cape Hatteras, or, to be exact, in latitude 37, longitude 71. It was the last day of October, and a stiff northwest gale was howling over the coastwise lanes. With topsails doused, the windjammer was laboring along on her course, when suddenly in mid-afternoon there came a strange grinding, crunching sound, and the Brown stopped as suddenly as though she had run into a stone jetty. There was no doubt as to the accident. The schooner had rammed a derelict, bow on.



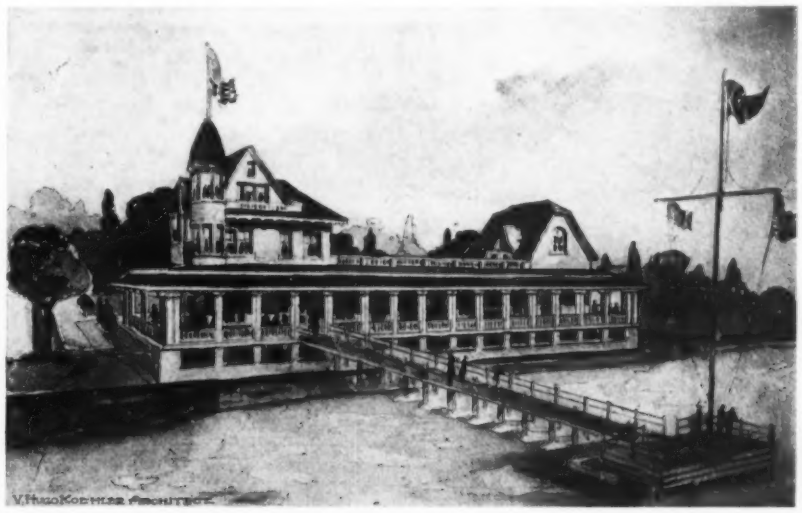
THE 27-FOOT CLASS. SIR THOMAS LIPTON HAS OFFERED A CUP TO ENCOURAGE RACING BETWEEN BOATS OF THIS SIZE ON MASSACHUSETTS BAY.

Her bow opened up like a wicker basket, and within five minutes the hold was filling and the schooner was working over on her beam ends. All hands ran aft and made the yawl hanging over the stern ready for launching. When the sea was flush with the lee rail they pushed off into the turmoil, getting away without mishap. They were just in time, for the yawl had not drifted 15 feet away when the schooner went over on her side, dipping her cross-trees under.

Now, the peculiar thing about the yawl in which the crew of

the wrecked schooner had made their escape was that in her stern she had a gasolene engine. It was started going as soon as the boat—22 feet long—was safely clear of the floundering hulk, and for five days the shipwrecked mariners fought the rough seas, not by working long hours at the oars, but merely by keeping her head to it, and, when necessity required it, keeping the screw revolving.

On the night of November 5, when the seas had abated considerably, the man on watch saw the starboard light of a vessel a mile or so to leeward. Now, ordinarily, the men would have watched and prayed while they waited to see whether their faint signals would be sighted by the vessel. There was nothing of the sort in the case of the men of the Brown. They simply started their "kicker" at full speed, and, within half an hour, had come up from astern on the schooner Brookline, Captain Sears, bound from Philadelphia for Porto Rico. When the Brookline was sighted, mark you, she was sailing away from the yawl. Without the engine the men in the yawl would undoubtedly have missed her and might have been afloat yet.



WEST LAWN, THE NEW HOME OF THE BROOKLYN YACHT CLUB ON GRAVESEND BAY.

This story led me to take a trip down to South street, in the port of New York, the other day, to see how many schooner captains had been as progressive as Captain Stevens, of the John Brown. I found that many of them had taken advantage of the opportunities offered by the internal-combustion engine.

"Yes," said one of a group of captains seated in the rear room of Crane's shipping office, "I have an engine in the stern of my yawl boat, and I guess most of the captains here will say the same thing. Even aside from the question of having to leave the ship—which, of course, is always remote—we can use the yawl for quick trips ashore. We do not have to hire a tug to go to land when we are lying out in the stream. I should estimate that half the schooners in the coastwise trade have gasolene yawls on the stern davits now, and it won't be long before they all have them. And don't whisper it, some day we'll hoist sales by gasolene power."

Speaking of gasolene in ships' boats leads me to reflect on the great change that has taken place in the handling of yacht tenders since the advent of the internal-combustion motor. It is not so very long ago that on a large yacht it meant calling away a boat's crew of four or five men, and a long, hard pull to the landing stage every time it was necessary to go ashore. Now one, or at most two, men do the work, and even in the smaller craft an engine of small power in the dinghy saves the owner many a tiresome row at the end of a hard day's work.

A boat that seems to embody the latest developments in the yacht tender is one that is building for Mr. George J. Gould's Atalanta, from the boards of the Gas Engine & Power Co. This is a twin-screw launch, 35 feet long, equipped with two six-cylinder engines, and a speed of 18 miles is guaranteed. This is a pretty sizable boat to swing from a yacht's davits, and one only has to consider the speed and comfort, as compared with the old gig or dinghy, to realize the change that the last few years have brought.

English Yachting

MARISKA, THE FIFE 15-METRE BOAT OF LAST YEAR.

OF course, it is the privilege of the yachtsman to do all his talking in winter and all his yachting in summer. It is more than a privilege; it is a habit. And you know, of course, that there is nothing the Briton is so conservative in as in his habits. For instance, it has become habitual with us to think that Americans would much rather not lose "the Cup." My views are well known on this subject, so that I need not repeat them at any length. I agree that your declinature of the last Lipton challenge was perfectly right within the four corners of the Deed of Gift. Further, I am convinced that only in the freedom given by the terms of the Deed can the racing yacht—machine, if you like—be successfully developed for speed. Strictly interpreted, the Deed prescribes a speed test, and consequently bars a challenge which is contingent on modifications of design. That is, however, merely my personal opinion; and, judging from the way people speak to me on the subject here, I am in the minority. The average Englishman has got it into his head that all your objection to the Lipton qualified challenges is bluff, and that you are really and truly in your heart of hearts afraid we shall beat you with a "healthy boat."

To anybody who knows what is what in yachting here and in the States, that is nonsense, of course. Mr. Herreshoff can very likely beat Mr. Fife just as much the one way as the other. Still, I am bound to say that in its adherence to the strict letter of the Deed the New York Yacht Club is, if not exactly old-fashioned, at any rate one-eyed to the fact that time works a lot of changes. Look at the matter this way. In the early fifties the sailing boat was not developed for speed at any price. The earlier Cup boats were not actually cargo carriers, but they were useful boats. The first of the "shells" did not, as a matter of fact, happen along until the early nineties. The modern cup boat is absolutely useless for anything but a cup race. Some millionaire may observe that that is no defect of the modern cup boat. It is all the boat is built to do. Yet I have no authentic news of New

(Continued on page 140.)

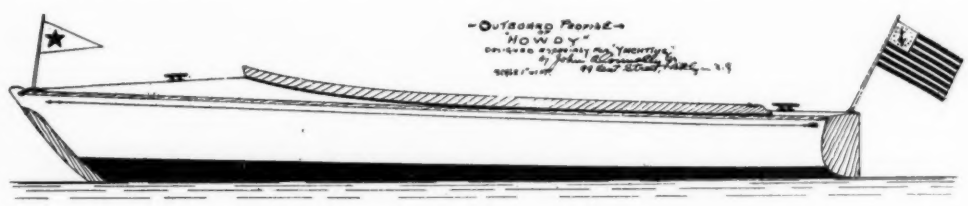
How to Build a 20-Foot Launch

By JOHN A. CONNOLLY, JR.

Drawings by the Author

FOR those who are thinking of trying their hands at building a power boat for next season's use, and are ambitious for something a little larger than the power tender which has recently been described in YACHTING, we are giving in this and the following number the plans, specifications, table of offsets, estimate as to cost of material, and instructions for laying down and building a 20-foot motor launch.

This is a boat of about the right size for the man who wants a handy craft for knocking around and for trips of a day or so in length, and at the same time one in which he will be able to take out a number of his friends. She has fine, easy lines, that should make her a good boat in fairly rough water and give her a fair turn of speed, and yet her construction plan is simple. She should not prove too much for any of our readers who are thinking of building, provided they have a suitable place in which to carry on the work. Her principal dimensions are: Length on deck, 20 feet; load waterline, 18 feet 1 inch; extreme beam, 5 feet; and draft, 1 foot 5 inches. The power recommended is any motor of from 2 to 5 horse-power of light-weight speed type, which should give a speed of from 8 to 10 miles per hour under favorable conditions.



In describing the method of laying down and setting up the frames we have not gone into the details quite as thoroughly as we did in the 13-foot power tender, as the method of procedure is exactly the same for the two boats, and we want to avoid needless repetition; so that any points of construction that are not clearly described here our readers will find fully covered in the November and December issues of YACHTING. We presume, of course, that the intending builder has at least a fair knowledge of the use of carpenters' tools. For those who are ambitious to build their own Howdy—for such has she been named—we have tabulated a list of the materials needed, table of offsets, and the following specifications, with the approximate cost of same:

Stem.—To be of clear white oak, 4 feet 6 inches by 12 inches by 2½ inches thick, free and clear of all knots and shakes, moulded as shown in construction plan.

Keel.—Main keel to be of clear oak, 16 feet by 6 inches by 2½ inches thick, also moulded as in construction plan. To be made out of straight material the same as stem.

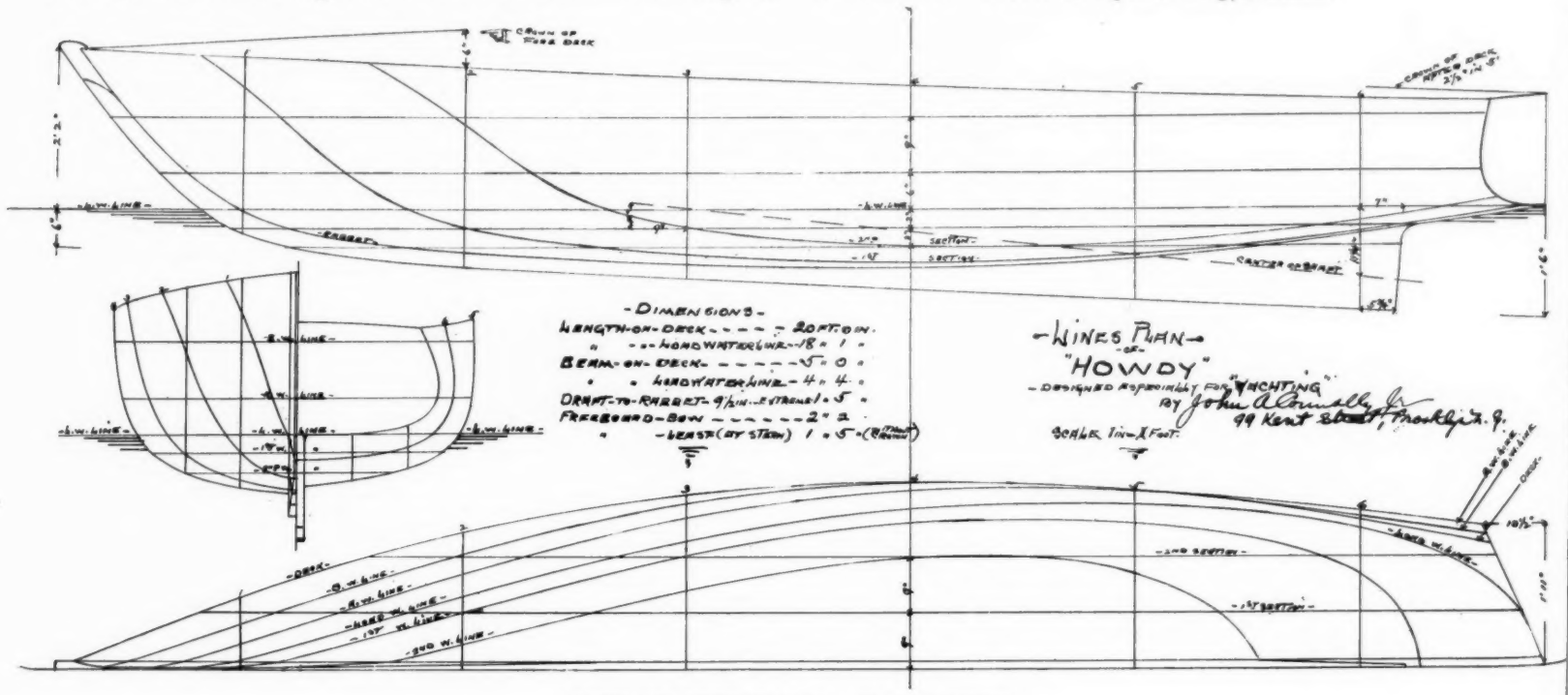
Shaft Log.—5 feet by 7 inches by 2½ inches, of same material as stem and keel, and moulded as shown in construction plan. After timber the same, but 4 feet 6 inches by 7 inches by 2½ inches.

Stern-center Upright.—A 1-foot 8-inch by 9-inch by 2½-inch oak knee, moulded as shown.

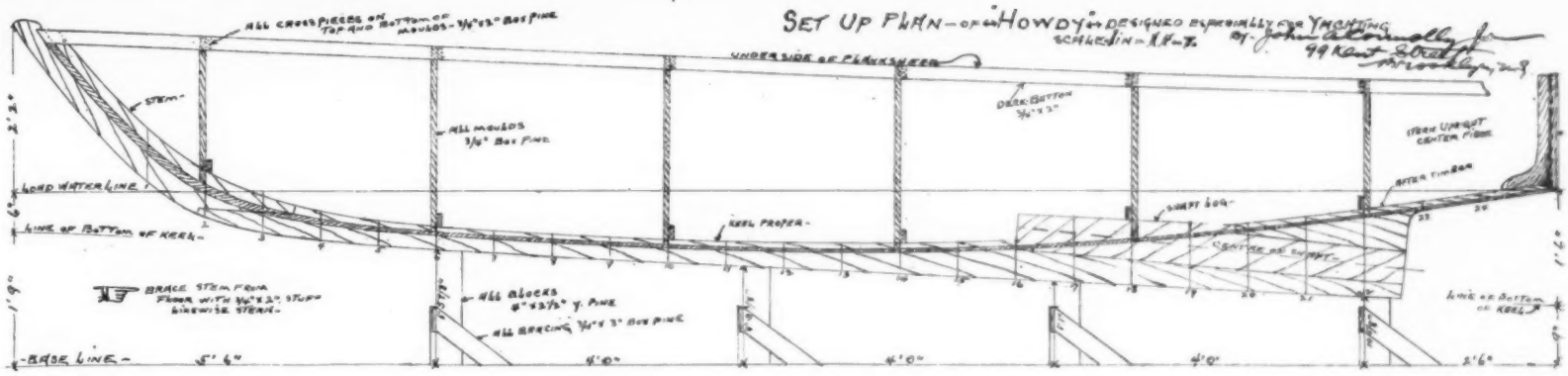
Stern Faces.—Of mahogany, 2 feet 2 inches by 1 foot 8 inches by ¾ inch; made of two pieces, on each side, running horizontally. Material to be free and clear of knots and shakes.

Frames.—Sawed from four oak boards, 8 feet by 1⅛ inches by 10 inches, of clear, green white oak. To be ¾ inch by 1 inch, spaced 9 inches center to center, bent to shape and dovetailed into side of the keel ⅝ inch. Fasten thoroughly, and, where possible, in one length from gunwale to gunwale.

Floors.—Two boards of clear and free white oak, 8 feet by 12 inches by ¾ inch thick, running in lengths 1 foot on each side of keel where possible, and jogging over top of keel ¾ inch. Fasten in place thoroughly to keel with a 3¼-inch galvanized lag screw, and to frames by 2-inch galvanized boat nails clinched over on ends. Floors in depth to be 3¾ inches.


-DIMENSIONS-
LENGTH-ON-DECK - - - - - 20 FT. 0 IN.
" -LOAD WATERLINE- 18 " 1 "
BEAM-ON-DECK - - - - - 5 " 0 "
" " LOAD WATERLINE - 4 " 4 "
DRAFT-TO-RABBET- 9/16 IN. (STRAIGHT) 1 " 5 "
FREEBOARD-BOW - - - - - - 2 " 2
" -LEAST (AT STEM) 1 " 5 " (SCANT)
-LINES PLAN-
-OF-
"HOWDY"
-DESIGNED ESPECIALLY FOR "YACHTING"
BY John A Connolly Jr
99 Kent Street, Brooklyn. N.Y.
SCALE 1 IN. = 1 FOOT.

LINES AND SHEER PLAN OF A 20-FOOT LAUNCH.



SETTING-UP PLAN, SHOWING LOCATION OF MOULDS.

Clamps and Bilge Stringers.—Four strips, 20 feet by ¾ inch thick, yellow pine or spruce, 2½ inches wide, running full length of boat and tapering on ends to 2 inches. Fastened thoroughly to each frame.

Deck Beams.—Spruce, ⅝ inch by 1¼ inches. One on each frame, gotten out to crown of 6 inches in 3 feet 9 inches on forward frames and 1¾ inches in 4 feet 3 inches on after frames. Sawed from spruce board 10 feet by 10 inches by ⅝ inch.

Sill.—Two spruce strips, 12 feet by 3 inches by ¾ inch thick, filling in space between clamp and end of deck beams amidships, and along after ones also.

Decking.—Planksheers of oak in one length, two strips 21 feet by ½ inch by 4 inches full width all the way. The balance of decking requires 72 feet of white pine or cypress ½ inch by 2 inches. Run the seams of deck with Jeffery's No. 7 black glue.

King Plank.—Clear white oak ½ inch thick, in size as shown on construction plan.

Coaming.—30 feet of white oak or mahogany, 10 inches by ⅝ inch, fastened in place by 1¼-inch brass screws.

Planking.—Top streaks and garboards to be of clear white oak. full length, and ⅝ inch thick. Make top streaks 4 inches wide amidships, tapering to 2½ inches on ends. The garboards are to be made 8 inches wide amidships. It will require two boards for each, and the top streaks should be 21 feet long and garboards 18 feet. Balance of planking to be of cedar ⅝ inch thick, and streaks to be not less than 3 inches in width. It can be gotten out of twelve planks 12 feet by 10 inches by ⅝ inch.

Engine Bed.—Two pieces of oak, 1 foot 9 inches by 2½ inches by 8 inches.

Knees.—Four in number, of oak—two forward and two aft.

Flooring.—Of cedar, 100 feet, 3 inches wide by ¾ inch thick.

Seats.—Of mahogany, 30 feet by 12 inches by ⅝ inch, or 15 feet by 18 inches by ⅝ inch.

Staving.—50 feet of cedar, 3 inches by ⅝ inch.

The fastenings should be of galvanized iron, and their total cost, including rivets, bolts, etc., should not exceed $8. Allowing $5 for paint, varnish, etc., the total cost of the above materials, including the last two items, should not exceed $65. It will be thus seen that a large outlay of capital is not necessary for one to build such a handy craft as Howdy, if he performs the labor himself. In a launch it is usually the cost of the engine that eats into one's pocketbook. As many good, reliable engines of small horsepower may be purchased to-day at a very reasonable price, the total outlay for the completed boat need not exceed $175.

LAYING DOWN THE LINES

Secure a floor space at least 25 feet long and not less than 10 feet in width. Clean floor thoroughly, and through center of this space run a line lengthwise. Call this your load waterline. It is to be a base line also. Start at the extreme left, and about 3 feet in, and 18 inches below load waterline strike up a vertical line for the stem line. Measure 2 feet 6 inches to the right of this, and after running in another vertical line at this point you will have Line No. 1. Continue to measure to the right of No. 1 three feet until you have run in six of these lines. Next, measure 2 feet 6 inches to the right of No. 6 and you have your stern line.

Run in next your waterlines as shown on lines plan, being respectively *B* and *A* above load waterline and 1 and 2 below. At No. 4 lay out your body plan, using the vertical line as the center line of plan. Take the measurements as given in the table of offsets and run in the respective lines. These measurements as given are to the outside of plank, and you will have to take off the thickness of plank in making the moulds to build with.

The amateur builders of to-day are generally familiar with the lay-down process, and it therefore is unnecessary to go further into details.

Next in order is to lay out properly the shape of stem, keel, shaft, log, after timber and stern faces, so that full-size patterns can be made of these parts and of all the moulds necessary to build with. If more concise directions as to laying down the lines, making the patterns and moulds and getting the latter set up are needed, they may be found in the November and December numbers of this magazine, in the article on How to Build a Thirteen-Foot Power Tender. After the moulds are made and set up according to set-up plan (being held together by bending around on each side a ribband about 21 feet long and 1 inch square, placed so that its under side will correspond with the top strake of the planking), we are ready to proceed with the hull.

(To be continued.)

MEASUREMENTS IN FEET—INCHES AND EIGHTS.

	STEM	1	2	3	4	5	6	STERN
DECK	0.4.2	0.11.5	1.10.0	2.3.7	2.6.0	2.4.4	1.11.6	1.6.4
B. WATER LINE		0.7.0	1.6.5	2.2.4	2.5.5	2.4.4	2.0.4	1.7.5
A. " "		0.3.7	1.3.0	2.0.0	2.4.3	2.4.1	2.1.1	1.9.4
LOAD " "		0.1.2	0.11.4	1.9.1	2.2.0	2.2.2	1.10.0	0.0.0
1ST " "			0.9.0	1.6.2	1.11.4	1.11.4	1.3.0	0.0.0
2ND " "			0.4.0	1.0.4	1.6.0	1.3.2	0.0.4	0.0.0
HEELS		0.1.2	0.1.2	0.1.2	0.1.2	0.1.2	0.1.2	0.0.0

SHEER	2.2.0	2.0.5	1.7.0	1.4.3	1.7.7	1.6.5	1.5.5	1.5.0
RABBET		0.0.2	0.6.7	0.8.6	0.9.4	0.8.0	0.4.1	0.0.0

B IS BELOW LOAD WATER LINE } WHICH IS BASE LINE
A " ABOVE " " "

MEASUREMENTS OF OUTSIDE OF STEM	RABBET	BEARDING	INSIDE OF PLANK MEASURED FROM MOULDS
SHEER	5.6.0	5.3.0	5.1.6	4.11.4
B. WATER LINE	4.9.6	4.6.0	4.4.4	4.2.0
A. " "	4.1.5	3.9.0	3.7.2	3.4.2
LOAD " "	3.7.0	3.0.6	2.10.0	2.5.3
1ST " "	3.2.0	2.1.0	2.0.5	1.6.0
2ND " "	2.5.7	0.11.4	0.6.0	0.0.0

FOR MEASUREMENTS OF BOTTOM OF KEEL, SEE LINES PLAN
FIGURES GIVEN ARE FOR FLAT STERN—FOR RAKE OF YACHTED STERN—SEE LINES PLAN

TABLE OF OFFSETS. SCALE OF DESIGNS, 1 INCH=1 FOOT.

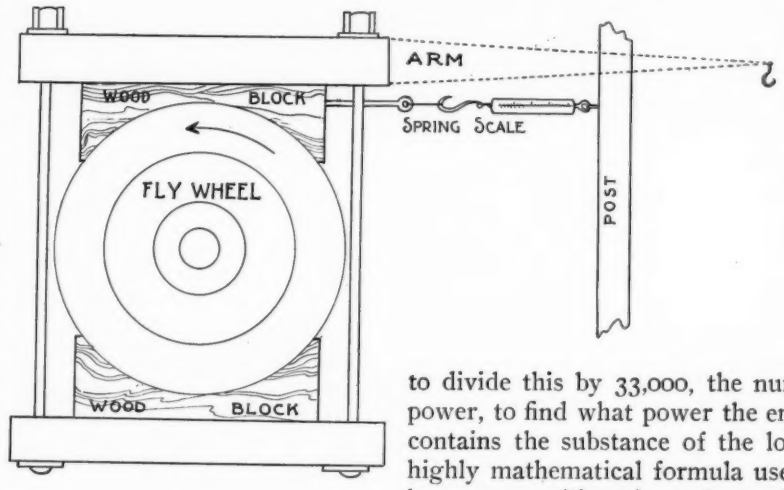
Measuring Horsepower

REAL AND RATED, AND HOW THEY ARE OBTAINED

By W. E. PARTRIDGE

HORSEPOWER has a very cloudy meaning for most men. The majority of them repeat the formula—horsepower equals 33,000 pounds lifted one foot in one minute—but when it comes to applying this to the measurement of the given amount of work an engine will perform, and the manner in which this measurement is arrived at, they are apt to be pretty much at sea unless they have had a technical training.

Horsepower means something more than so much work done. It is a term that always includes how fast the work is done. The name came into use more than one hundred years ago, when pumping engines began to be common in coal mines and were replacing horses. It was found that the big brewery horses used in London (the heaviest horses in use), when working ten hours per day, going 2½ miles per hour, averaged what was equivalent to hoisting 33,000 pounds one foot high per minute, or 550 pounds a foot high in one second. The measure of power, therefore, is a certain weight lifted in a given time a fixed distance. The result is the same if we move 33 pounds 1,000 feet high. The height, multiplied by the weight, must produce the same result, or, as the engineers express it, the same number of "foot-pounds"—that is, a pound lifted through the distance of one foot.



When we have the problem of finding the power of an engine, the question takes a little different form. In the steam engine there are usually two working strokes at each revolution, so that when we know with what pressure per square inch the steam pushes the piston down or up at each stroke, the area of the piston, the distance it is moved each time, and the number of times in a minute, it becomes a simple matter of arithmetic to find how far this number of pounds pressure has traveled in a minute. Then we divide by 33,000 and have the horsepower. By the use of instruments—the indicator, etc.—the pressure in the steam engine cylinder under all sorts of conditions has been so accurately ascertained that, with a given cylinder and steam pressure and at a given speed, the horsepower can be pretty accurately ascertained by calculation.

With the gasolene or internal-combustion engine we have quite a different proposition. By using the indicator, we know pretty accurately what goes on in the cylinder of the steam engine, and are able to calculate the power with great accuracy. Even an expert finds great difficulty in using the indicator on the internal-combustion engine, and on many types the construction is such that it cannot be used.

Calculating the power of any gasolene engine involves too many unknown or variable quantities to give a result of any value whatever. It is for this reason that we see one manufacturer estimating his engine to be of a certain horsepower, and another, building an engine with the same number of cylinders, of the same bore and stroke, calling his engine twice as powerful as the other. What happens in the cylinder is uncertain, as the pressure is not equal throughout the stroke, being greatest at the beginning and diminishing rapidly at the end of the stroke. The "rated" horsepower is thus too uncertain to be worth talking about. The bore, stroke, number of cylinders and revolutions per minute would be a much more sensible way of expressing an engine's size.

There is, however, a method of finding out what an engine can do: the "brake horsepower" tells us just how much power it can deliver on its shaft. It is even possible to weigh the work it can put upon the propeller, and so set at rest completely the power question. Unfortunately, the latter cannot be readily accomplished, as few boats are so constructed as to permit the proper arrangement of parts. A brake test is, however, possible in any case, and is quite easy. It gives the actual power of the engine at the fly-wheel. It leaves out the friction of the shaft and the loss of power in the propeller wheel. The apparatus used is called a "Prony brake," from the name of the Frenchman who invented it. Some authors, in writing about it, have used the word "pony" instead of the correct name.

The Prony brake consists of blocks of wood strapped to the fly-wheel in such a manner that, while they grasp it firmly, it can still turn at its proper speed, while the blocks remain stationary. The work done is found by measuring (weighing) the pull which it takes to hold the blocks from turning with the fly-wheel. This pull in pounds, multiplied by the distance around the fly-wheel in feet and by the revolutions per minute, gives the number of "foot-pounds." We only have to divide this by 33,000, the number of foot-pounds in a horsepower, to find what power the engine is giving. This simple rule contains the substance of the long and apparently complex and highly mathematical formula used by writers on the subject. It is common arithmetic, and not algebra, that is needed.

The accompanying diagram shows the Prony brake in its simplest form.

It is usual on engines of any size to put on a long lever, so as to reduce the pull on the scale. This complicates the computation. The dotted line shows how the lever operates. Instead of the distance around the fly-wheel, we have now to use twice the distance from the center of the fly-wheel to the point where the scale is attached to the lever (in feet) and multiply this by 3.1416. This is the same as taking the circumference of a larger fly-wheel, equal in radius to the distance from the center of the shaft to the hook at the end of the arm. The formula would then be:

$$\text{H.P.} = \frac{2 \times 3.1416\ L\ R\ P}{33{,}000}$$

in which L equals the length of the arm in feet from the center of the fly-wheel to the hook to which the scale is attached, R the number of revolutions per minute, and P the pull in pounds.

Let us take, for example, the following: $L = 4$ feet, $R = 600$ and $P = 50$. Then

$$\text{H.P} = \frac{2 \times 3.1416 \times 4 \times 600 \times 50}{33{,}000} = 22.8.$$

(Continued on page 140.)

"RINGLEADER SWUNG IN THE FAIRWAY WITH MAIN AND FORESAIL SET."

For the Honor of the Fleet

By HERBERT L. STONE

THE fishing had been bad on the Grand Banks that summer. So bad that after Quereau, St. Pierre, the outlying Virgin, and the smaller banks known only to those who go there year after year had been tried without wetting more than a few barrels of salt, a number of the American fleet eased sheets and stood for the Labrador in a last endeavor to get a fare. And now, at the tail-end of the season, some of these had slipped into Nain for water before weighing for home. "Red" Elliott, at the wheel of Nourmahal, counted three of them as his vessel nosed past the sheltering islands and opened up the anchorage at the head of the harbor.

"Two Gloucestermen an' the Ringleader from the ole town, or I miss my guess. 'Bully's' got a full fare, too, from the way she rides," he dropped casually to the bunch lining the rail aft, eager for a sight of even the forbidding coast of Labrador and the scattered houses of the mission. A little later "Red" Elliott, dropping into a dory, sculled alongside of Ringleader, and, taking hold of the main rigging, swung himself aboard.

"Where's 'Bully'?" he inquired of the man on deck, with a nod of recognition.

"You'll find him b'low with 'Chick' Weston an' the skipper of the Fair Play," they answered, and Elliott turned aft.

At the head of the companion steps he was met by the reek of B. & L. plug cut, which he drank in unconsciously, as he would the smell of the sea driven in by an east wind. A voice hailed him as he opened the door to enter.

"Hello, 'Red'! There's no mistakin' your searchlight, even in this fog. Come in an' give an account of yourself; ain't seen you since we left home, tho' I heard we was both on the Virgin three months ago," and as Elliott lounged good-naturedly into a vacant chair, "will you have a drop of liquor? Picked up a few bottles at St. Peer when I dropped in for some bait after fishin' my heart out on Green Bank."

"How're you, 'Bully'? It's no use askin' what luck, for it sticks out all over you, even if I hadn't seen your vessel ridin' as deep as a Maine stone schooner. Hello, 'Chick'! How're you, Cap'n Isreal?—That'll do, 'Bully'; easy, now; easy! Well, here's luck!"

"We ain't complainin', tho' we did have to come 1,800 miles to find 'em," went on McLoughlin, with a complaisant smile. "And you?"

"Middlin'! Mebbe two thousand quintals salted down; but we've been the better part o' four months gettin' 'em."

"The time's nothin', so long as you get 'em. 'T wouldn't matter so much with us, but you couldn't afford to go back with less than a fare on a maiden voy'ge. How does Nourmahal travel, 'Red'? They was sayin' as how she'd skin the fleet when I left Provincetown—an' I'll admit she looked a likely one on the ways."

"Couldn't ask for more. She averaged 200 all the way to the New F'un'land Banks, an' 250 from there to the Labrador. Three

hundr'd an' eighteen knots I got out of her 'tween noon an' noon on my best day's run—three hundr'd an' eighteen on a broad reach, an' no more 'n spray wettin' her decks. She's a flier, 'Bully', an' no mistake." Elliott's face glowed and his eyes unconsciously spoke his pride in his new craft as he dwelt upon her performance.

Now, "Bully" McLoughlin had long been known as the hardest driver out of Provincetown. Ever since he had had her the Ringleader had been counted on to make the quickest trips. It was a bad summer when "Bully" did not lead the fleet home, bringing the news of how the others fared on the Banks. And now, as Elliott talked on, "Bully," leaning back in his chair, watched him through half-closed eyes, as the realization was borne home to him of what it would mean if this new schooner, with her yacht lines, designed by the smartest man in Boston, were to wrest his title from him. Up to this moment he had not believed that Ringleader could be beaten. Nor did he believe it yet. No! Give him the wind, and he would show this new schooner the way into Provincetown. He would show them that his boat had not been outbuilt. As "Red" paused in his absorbed recital of the points of his new pet, McLoughlin straightened up, and, taking his pipe from his mouth, leaned across the table until his face was close to Elliott's.

"Tell you what, 'Red,'" said he; "you seem so powerful set on the way your new boat goes, I'll bet you my lay for the voy'ge against yours that I beat you into Provincetown, boat for boat. I've faith in the Old Girl yet."

For a moment Elliott, taken aback by the suddenness of the proposition, did not answer, while 'Chick' Weston fetched a long, expressive whistle.

"It's a sporty proposition, I know," went on McLoughlin; "but we're both unmarried men, an' what's a season's pay, win or lose, when you're backin' the boat you've faith in? 'T ain't as if we'd families, with our lays half spent before they 're earned. If 't was Loney Thomas, now," he added, as if from an afterthought, "there 'd be some excuse for his hangin' back, for they 're a sayin' as how he's to be married as soon as the Grace Manta lays up for the winter, an' with that prospect it ain't likely he'd care to take a chance with his lay."

Elliott flushed to the roots of his auburn hair at this last remark, while the others grinned. It had been whispered about Provincetown before the fleet sailed that Loney Thomas had taken advantage of a trip to Bay of Islands for frozen herring that "Red" had made the previous winter to cut him out with a certain maid for whose favor the latter had long sought, and, apparently, partly won. Elliott never dropped a word on the subject himself, but it was noticed that there was a marked coolness between him and Loney.

The flush left his face set and hard, as he answered, quickly: "I'll go you! My lay against yours, an' the first to let go inside Long Point takes the money. It's a good thing for you, 'Bully,' you've no wife an' kids at home, for they'd surely have lean pickin's this winter. What time do you sail?"

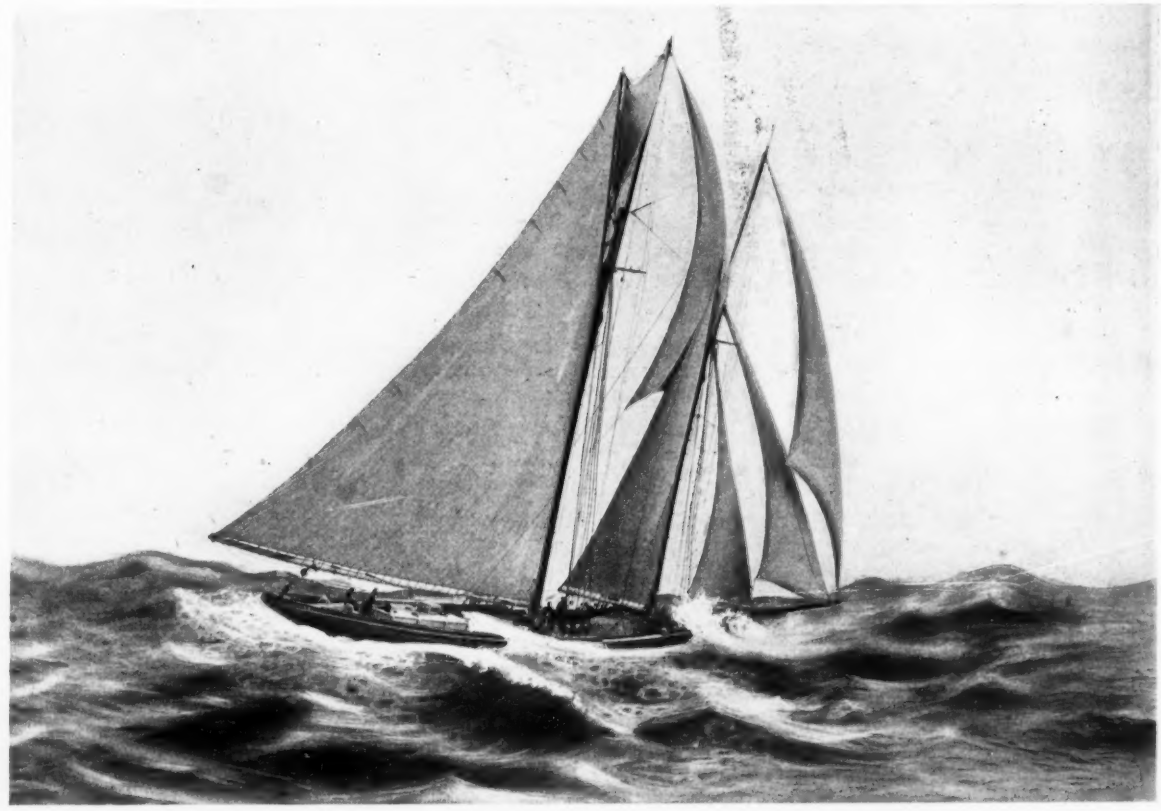
"Daylight in the mornin'. When 'll you be ready?"

"Not before noon. Got to fill my casks in the mornin'; but I won't be long after you."

"I'll wait. We'll start fair. The Old Girl doesn't need to ask odds in this."

"As you please, tho' you don't need to wait on our account. I'm satisfied either way.—No more, 'Bully'! No, not a drop, thank you! Glad to see any of you aboard Nourmahal; stop and look her over on your way back, won't you?"

It was exactly noon the next day when the clank of a windlass drifted across the water from the Ringleader, where she swung impatiently in the fairway, with mainsail set and throat and peak jigged taut. To the rhythm of the rising and falling windlass brakes the welcome homeward-bound chanty broke lustily forth in a rousing chorus:



"ELLIOTT WATCHED THE MAIN TOPMAST ANXIOUSLY AS THE MEN SENT UP THE HUGE FISHERMAN'S STAYSAIL."

"Oh, we'll heave her up an' away we will go,
Good-by, fair-you-well,
Good-by, my lads, we're homeward boun',
We're bound away to Provincetown;
Good-by, fair-you-well,
Fair-you-well an' Good-by."

As the familiar words came down the wind to Nourmahal, "Red" Elliott stuck his head out of the companionway, looking anxiously shoreward for his boat. She was close at hand with the freshly-filled scuttle-butt in her stern, and, as soon as this was hoisted aboard, Elliott called his men aft and addressed them tersely and to the point:

"Now, boys, you see Ringleader over there a heavin' up for home. 'Bully' McLoughlin an' his men have passed it out as how they 're goin' to show us the way into Provincetown. Now you all know 'Bully', an' know what it means when he says that; his word's enough for him to make good, tho' I don't mind tellin' you there's a bit of a stake up, too. An' you all know what's before you when I tell you he ain't a goin' to do any such thing. Now, I don't want any of you to go into this thing with his eyes shut.

There'll likely be a bit of carryin' on, an' if anyone doesn't like the prospect now's the time to say so; I'll put him ashore an' he can go home in the Fair Play—they'll be glad of a few extra hands. But I don't want any hangin' back after we get to sea. Now, does anyone want to go ashore?"

For answer, the men only looked at one another and grinned, while one at the back of the group said, loud enough to reach the skipper's ears: "Guess we're jest as anxious to see the Provincetown girls as 'Bully's' bunch." No one moved.

"No one wants to go, then? Good! I didn't think I had a quitter. Now get the mains'l on her an' heave short," and "Red" turned aft to cast off the crotch tackle.

By the time the anchor was broken out and her nose swung off under the weight of the head sails, Ringleader was showing the way down the harbor by some four miles. It was breezing up fresh from the eastward, and Elliott drove his vessel out under lower sails, to try the weight of the wind outside. As Nourmahal swung past the last sheltering point of land and reached the open, she settled down to her work, with the chain-plate bolt-heads tearing the water into foam along her side and the lee scuppers spouting tiny jets of swirling white water up the deck. As she slid easily over the first of the long, white-topped ridges that met her playfully, the crest broke under the cat-head, drenching the hollow of staysail and foresail with fleecy spray. "Red" himself was at the wheel, feeling her, and after a long look up to windward and at the sea ahead, he sang out sharply:

"Main tops'l!"

It was set quickly, and was followed immediately by the jib topsail. The added weight put her down until the coils on the lee pin rail were awash, and drove her into the seas viciously. It was all she wanted, and the boys thought the skipper would stop there; but it did not satisfy "Red." Ahead of him he could see the sails of Ringleader, hull down, and through the glasses he made out that "Bully" was carrying both topsails.

"Main topm'st-stays'l!" came the order, without hesitancy. "Send down your fore'tops'l halyards and hook on to the main topm'st head for a preventer back stay, makin' fast to the quarter bitts!"

Elliott watched the main topmast anxiously as the men sent up the huge fisherman's staysail, with many an expression of the fact that the Old Man was surely pushing her. It buckled dangerously once or twice as Nourmahal jumped into the seas before the sail was

"FOR TWO DAYS THEY DROVE ALONG UNDER FORESAIL AND FORESTAYSAIL."

mastheaded; but, once set, and sheet and tack taut, it stood up well. Being on a broad reach, the sail seemed fairly to lift the schooner from one crest to another, without giving her time to slide down the intervening hollows, while the swinging seas smashed themselves angrily against the sharp bows, sending a cataract of fleecy water as far aft as the wheel-box. The rail was now completely under, with the water half-way to the hatch coamings, and the end of the main boom swept every white-bearded sea as it raced through their lee.

All that afternoon they drove her after the white patch ahead of them as she had never been driven before, Johnny Flynn, the best helmsman in the crew, at the wheel, and "Red" Elliott standing by, watching every sea that lifted her skyward and then rolled away under her, dropping her into the lap of the next.

"She's doin' better'n thirteen if she's doin' one," he said to the mate late in the day, after a look at the swirling water over the quarter; "but I don't like the look o' things up to wind'rd. Wind's a haulin' to the no'theast, and seems to have more behind it than it did. What's the glass doin'?"

"Gone down two-tenths in the last hour. Looks to me as if we'd have a dirty night."

The crew, in dripping oilskins, were bunched aft, or hung on to main rigging and fife rail for support while they watched the spars aloft, expecting to see something go every time the end of the main boom trailed a sea. It was not till darkness was on him, however, that "Red" ordered the topsail and staysail in. It was sheer flying in the face of Providence to carry them longer. The wind, having the makings of a young gale, had backed still farther on their quarter, and the boys hung around before going below, expecting to reef the mainsail. But the order did not come. They were yet to learn how far their skipper would go.

As the night wore on the gale increased, but not a sail did he start. The heavy, quartering seas which rose ominously over the stern, as if about to pour their seething tops on to the poop, would lift the stern, slow her till the rudder caught and steadied her, and then, rolling sullenly underneath, would carry the schooner madly forward on their crests, with the white, crumbling brine level with the top of the buffalo. From below the mournful creaking of bulkhead and partition told the agony they were undergoing. The watch, going below at midnight, told the news of the deck as they got out of soaked oilskins.

"It's blowin' like all Hell let loose up there," they said, each man taking his

fling at the skipper, an' that crazy 'Red' hasn't started a sail. There's two men at the wheel tryin' to keep the bitch steady, an' a hand at each of the main halyards, with the coils off, ready to let go if he sings out. But there ain't no danger of his singin' out—not him! He'll carry on till the hull mess goes. Twice she couldn't rise quick enough to reach the following crest, she was a travelin' so, an' the green water broke clean over the knightheads, sloshin' aft to where the Old Man himself stood, takin' it as easy as he would a town-meetin' at home. I tell you he'll run her clean under—if she doesn't throw a plank first. 'Taint no way to use a ship, I say, even if she is new."

They were still grumbling when the schooner gave a violent slew that threw off their feet those that were standing, a cataract of water crashed on deck, mingled with the sharp crack of splintering wood, and a deluge poured down the companion hatch, which the watch had left open on coming below. Half drowned, they struggled up the ladder, only to find that a huge sea had boarded her amidships, carrying away one of the nests of dories lashed on deck. They could hear "Red's" voice from somewhere aft directing them to get the wreckage overboard and pass extra lashings around the dories that were left.

When the mate came on deck for his watch, Elliott pulled him to one side and said: "The boys are gettin' kind o' uneasy about things, an' I'm afraid o' that bunch there by the mainmast. First thing we know those fellows on the halyards 'll get chicken-hearted an' let go without any warnin'. Chase 'em all aft an' stan' by yourself, an' don't let any one slack off unless I give the word. You understand!"

As soon as the lagging daylight came "Red" reached for the glasses and carefully swept the circle where the gray, leaden sky merged with a gray, sullen sea, looking anxiously for a patch of dull canvas. Nothing was in sight. Was it still ahead? Elliott could not believe it, seeing what Nourmahal had done that wild night; and yet, knowing "Bully," it was hard to believe that he was behind. At any rate, something had to come in. It was blowing a whole gale, with promise in the low-driving clouds of more to come, and the upper Labrador was not a place to take lightly in the autumn. So, reluctantly, he ordered the mainsail in—it was no use reefing it; the foresail would give her all she wanted.

The boys did not have to be urged, and the great sail was soon furled and the long, limber boom securely stayed. For a while the schooner went easier, but it was not long before she was driving just as madly through the seas before a screaming gale from the northeast. Near noon the skipper caught the sun through a rift in the clouds and hurriedly worked up his position. It showed 330 miles for the twenty-four hours—a record run for a Provincetown vessel—and "Red's" face reflected his satisfaction. Ringleader could not beat that going. It was not in her lines.

For two days more he kept her before it, part of the time under reefed foresail when by rights she should have been hove-to and riding it out under storm trysail. At the first sign of a let-up they shook the reef out of the fore and set the mainsail, double-reefed. Their noon sight that day showed an average of over 300 miles for each of the three days they had been out, and, with a grunt of satisfaction, Elliott broke his long vigil, and, with clothes on, turned in for his first real sleep since leaving Nain, giving orders to the mate to call him in four hours, when the watch was changed. There was to be no let-up in the pace.

It was not yet eight bells when "Red" was awakened unceremoniously by the mate shaking him by the shoulder.

"There's a schooner in distress four points on the starb'ard bow, sir; both masts gone an' the ens'n flyin' union-down from the stump of the main. Shall I haul the wind an' stan' over to her?"

Elliott followed the mate to the deck and got a momentary glimpse of the hull of a schooner as it lifted skyward on a sea, and

(Continued on page 134.)

The Sonderklasse

By J. L. STACKPOLE

THERE is no class on the New England coast that has furnished keener racing or better sport for the owners of the boats than the so-called *Sonderklasse*. In 1906, with a big list of entries for the trial races, and in 1907, when an American team went to Kiel, they were much in the public eye; and this last season—though there was no international race—saw some rattling contests in all sorts of weather, that have kept the class very much alive. With the coming of the Germans next summer, it may be interesting to know something of the history of the class and the conditions under which it developed.

The class is an old one on the other side of the Atlantic, and originated, we are told, in Great Britain. It was adopted by the yacht clubs of Germany, where it represents by far the best of the small-boat racing. It is also a flourishing class in the other countries of Continental Europe, notably in Spain, where the yacht clubs of Bilbao and San Sebastian held races for the American representatives in 1907.

MARBLEHEAD. SHE WAS OF THE SCOW TYPE, AND DID NOT DO WELL IN THE ROUGH WATER AT KIEL.

The German yachtsmen will bring three *Sonderklasse* boats to Marblehead next summer to race against three boats representing the Eastern Yacht Club for a cup given by the latter club. The Spanish yachtsmen will be invited to send boats in this class to Marblehead in 1910. International racing, therefore, in this class is assured for a number of years.

The cause of the popularity of these small boats as racers is not difficult to discover. The restrictions are extremely simple. The most important are, first, that the waterline plus the draft plus the extreme beam shall not exceed 32 feet; second, that the sail area shall not exceed 550 feet; third, that

the weight of the boat, with the equipment and without the crew, shall not be less than 4,035 pounds; and fourth, that the planking shall not be less than 5/8 of an inch thick. The crew must be amateurs and consist of not more than three persons, and the cost, including two suits of sails, is limited to $2,400, though it is possible to have one built for something less than this amount if necessary.

It will be noticed that there is no restriction in these rules as to the shape of the hull, except that they practically require the boats to be of the keel type. The result has been that boats in this class have been built in various models, from the extreme scow to the narrow, fine-bowed type; and it has not yet been determined with any degree of certainty which of the many types between these two extremes is best. The latitude thus given to designers, with a corresponding chance for improvement, is very great, and no one can say when the limit of speed has been reached, even for particular weather conditions.

In 1906 seventeen candidates, representing all the well-known designers of small boats on the New England coast, contested for the right to meet the German boats and race for the Roosevelt Cup, offered by the Eastern Yacht Club. The boats that won the honor were Vim, a boat of moderate type, neither very "scowy" nor very fine, designed by Gardner; Caramba, a wide, flat boat of the scow type, designed by Boardman, and Auk, a narrower scow, also designed by Boardman. The three boats raced by the Germans at Marblehead in 1906 were rather narrow craft of comparatively shallow draft, that looked small by comparison with the bigger hulls and longer overhangs of the American boats. The result was that the Germans won only one race—that in very light weather—which Wansee took by her superior speed before the wind. Vim proved to be the best all-round boat, and won the Roosevelt Cup with three races to her credit.

In 1907 the Eastern Yacht Club sent three boats to Kiel, Germany, to race for the Kaiser's Cup. Of these, Spokane, designed by C. H. Crane, was a boat which the previous year had been an unsuccessful candidate. She was a wide, rather flat boat, with short, drawn-in ends. Marblehead was a scow with rather high ends, designed by B. B. Crowinshield, and Chewink, designed by Small Brothers, was a boat of the scow type, with long overhangs.

CORINTHIAN. A SCENE WHICH SHOWS WHAT THE SONDER BOATS CAN DO IN A STRONG BREEZE.

TILLY X, SAILED BY PRINCE HENRY OF PRUSSIA, SHE TOOK THE SECOND RACE AT KIEL IN 1907. WITTELSBACH II, ONE OF THE GERMAN SONDER BOATS THAT HELPED DEFEAT THE AMERICAN TEAM AT KIEL.

These boats were met in Germany by three boats designed as improvements on the American boats of the year before, the plans of which our designers had sent to Germany. The German boats were better adapted to the heavy conditions of wind and weather met at Kiel, and Wansee II was victorious.

The winds at Kiel were found to be strong and heavy, in great contrast to the light winds usually prevailing at Marblehead.

In Spain the American boats were met by three Spanish boats designed for the extremely light winds that prevail there. Doriga won the Spanish international cup.

This year—1908—there was no international competition, but a number of boats have raced in this class at Marblehead. There was but one new boat. The best boat, so far as this season's record discloses, is one built in 1906, and not chosen either in that or the following year as an international competitor.

Although the racing around Marblehead has tended to show that the scow type of boat is the better, yet, on the other hand, Vim—a comparatively fine-ended boat—won the Roosevelt Cup in 1906, and Wansee II—a boat of the same type—won the Kaiser's Cup in 1907. The scow has yet to show its superiority in an actual international race. This leaves the question as to which type is best still an open one. Should the ends be flat and low, or should they be fine and without reverse curves? Should the depth be above or below 5 feet, and what should be the width? Should the weight of the boats be several hundred pounds in excess of the minimum allowed, or should the weight be kept down? The distribution of the sail area of 550 feet between the mainsail and the jib is by no means a settled problem. These questions are not yet answered, after many years of racing in Europe and three years of racing in this country with boats designed by Boardman, Herreshoff, Crane, Burgess, Crowninshield, Small, Gardner and others. The class so far has, naturally, been fostered only at Marblehead; but its international character and the importance of the events warrant the building

(Continued on page 138.)

With Our Readers

Measuring Quarter-Beam

ALTHOUGH the recent meeting of the Atlantic Coast Conference amended the measurement rules so as to substitute load waterline for quarter-beam length as the basis of the rating formula, it still retained quarter-beam length as a restraining factor for preventing excessive overhangs. As it now stands the rule reads as follows: The *L* in the formula shall be the load waterline *plus* one-half of the excess of the quarter-beam length over the percentage of the load waterline given by the formula: $100 - \sqrt{L.W.L.}$

So it will be seen that quarter-beam still has to be measured. This matter of quarter-beam has caused considerable trouble to official measurers, and is a constant source of confusion to the uninitiated, inasmuch as it is not a measurement that can be obtained by merely running a tape, and the points of its extremities are not defined on the yacht itself, as is the waterline or the over-all length.

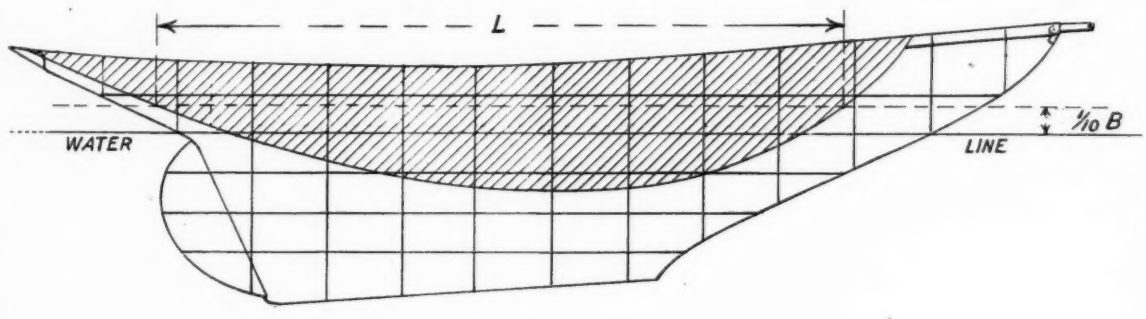


FIGURE 1.

Quarter-beam length was evolved originally to restrict the tendency towards extreme overhangs and freak boats. In a general way it is a longitudinal dimension at such a point as to be most favorable to well-shaped and seaworthy bodies. Literally, it is a line parallel with the middle fore-and-aft vertical plane at a distance from it equal to one-quarter of the greatest beam at the waterline and one-tenth of this beam above the waterline.

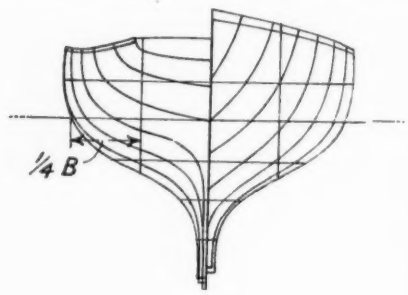


FIGURE 2.

Perhaps the easiest way to make the position and measurement of quarter-beam clear is to suppose the case of a solid model, which may be cut up at will. As a first step, we will plane a fore-and-aft slice from the model. This section shall be vertical, and we will leave just half the thickness of the half-breadth model at the waterline. That is, we have taken off just one-quarter of the greatest breadth of the hull. On this flat side, as shown in Figure 1, we are ready to measure quarter-beam length; but to do this we must draw a line parallel with the waterline and above it one-tenth of the beam at the waterline. See dotted lines in Figure 1. The breadth is taken each time at the widest part on the waterline. Now the length on this dotted line just mentioned, from the outside of the planking at one end to the outside at the other, is the quarter-beam length.

To put it another way: We cut our model apart horizontally at a point one-tenth of the beam above the waterline. On the deck thus made, half-way out from the center line we measure the length of the hull which remains. This will be quarter-beam, the same measurement as before.

When we have a boat's lines on paper this dimension is not difficult to get, although if on a small scale much care must be taken when the intersections come at small angles. But as boats after launching vary somewhat from the dimensions as given in the plans, they are usually required to be measured while afloat. To get the quarter-beam on the vessel herself when she is afloat is quite another thing. A plumb line and float battens and a knowledge of the process will be required in order to get the measurements with any degree of accuracy. It is usually done by laying down the quarter-beam line on the deck, allowance being made for the difference between beam at waterline and extreme beam. This line is carried forward and aft, parallel to center line of boat, and at the points of intersection with the rail plumb lines are dropped outboard. From these two plumb lines, at the required distance above the water, the distance in a fore-and-aft line to the outside of hull is measured. These are the points of extremity of the quarter-beam, and the sum of these two measurements may be deducted from the length of the quarter-beam on deck.

By looking at the cuts it will be seen that quarter-beam length is not equal to the waterline length on a boat of what may be called normal lines, though in the extreme scow models it may exceed the waterline considerably. The hollow bow gives no advantage, because in measuring the lines are made fair.

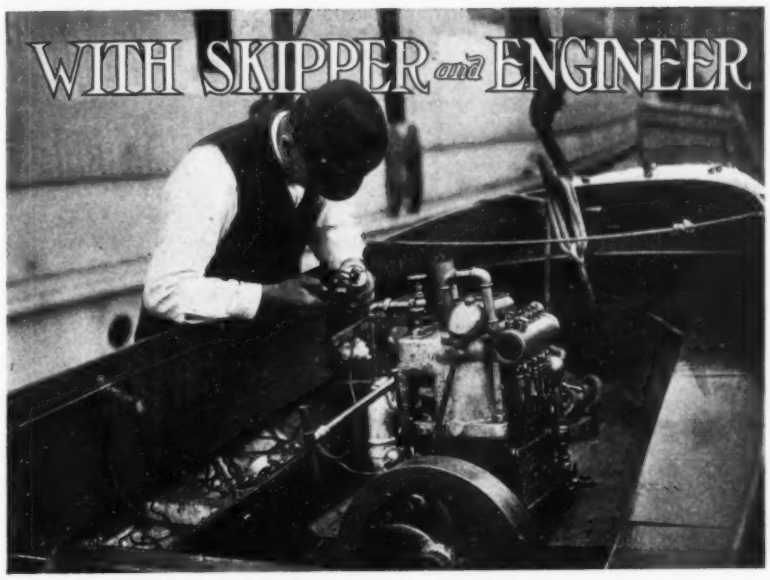
A Course in Nautical Science

HERE is a chance for those who are thinking of entering any of the ocean races next summer to pick up, with the aid of a little studying, enough navigation to make them independent of professional navigators on these races.

A course of lectures in Nautical Science is being given at Columbia University this winter by Charles Lane Poor, professor of astronomy. These lectures will be held in Schermerhorn Hall at 4.30 P. M., and will be illustrated. They should prove of great interest to yachtsmen, especially to those interested in navigation.

The lectures are open to the public. No tickets of admission are required, but it is requested that those who desire to attend the course regularly will notify either the secretary of the university, Mr. F. P. Keppel, or Professor Poor. The dates and subjects are as follows: January 28, Finding One's Position at Sea; February 4, Latitude; February 11, Longitude; February 18, The Cause of the Tides: The Moon; February 25, The Prediction of the Tides; March 4, Tides and Tidal Currents of Our Coast.

Prof. Poor is so well known to the yachting fraternity, not only as a theoretical expert but as a practical sailor as well, that we hope all yachtsmen who may find it possible will attend.



A Little Talk on Gasolene Consumption

WE have had so many inquiries in this office as to the comparative economy in the matter of gasolene consumption of the two-cycle and four-cycle motor, and also of the single and multi-cylinder engine, that it might be of interest to answer them in this column.

In general practice it is the custom to allow one pint of gasolene per horsepower per hour for a four-cycle motor and about a pint and a third for the two-cycle type. This assumes an increase in consumption of 33 per cent. for the two-cycle motor over the four-cycle. We do not believe that the above assumption is borne out by the facts at present, however, as carefully conducted tests of recently designed two-cycle motors have shown them to be nearly, if not quite, as economical as the four-cycle type. No one need be deterred, other things being equal, in buying a two-cycle motor on account of greater gasolene consumption. As regards the multi-cylinder, the consumption is, theoretically, no greater per horsepower than in the single-cylinder. In low-power motors, say below 10 horsepower, there is much to be said, however, on both sides. The single-cylinder engine is simpler and requires fewer adjustments, while the two-cylinder keeps its weight lower down and runs more smoothly. The multi-cylinder has more electrical connection to worry over; but if one cylinder goes wrong there is another with which to limp home. It remains a matter of individual choice, governed by circumstances.

Getting Home with a Broken Ball Thrust Collar

Any ball bearing, unless it be of the most expensive make and thoroughly protected from dirt, should have the balls renewed whenever they show the slightest wear. If the balls in the thrust bearing begin to break up when the boat is at sea, the thing to do is to take them all out and allow the races to come together. If, on account of the arrangement of the propeller or shaft coupling, there is not enough end movement to permit this, it becomes necessary to whittle out a split disk of wood *A A* (see sketch) of such thickness that it can be put back of one of the races *B B'*, with its two halves wired together, thereby bringing the races together. Usually the stationary race *B'* is backed by a wide enough shoulder to save the wood from crushing. The two races should be oiled with a slush of oil, grease and graphite, mixed to about the consistency of gravy, and applied very thoroughly. Albany grease is preferable. The impromptu thrust bearing will bear a good deal of watching, and quite possibly the engine will have to be run slowly, to prevent it from overheating. There is some danger if the race *B* on the shaft is backed only by a narrow collar, instead of by the end of the coupling *C*, that the rotation will take place between the shaft and this race instead of the race following the shaft. This quickly results in cutting the shoulder of the shaft to pieces; but unless the race is held by a pin in the shaft it is difficult to prescribe a remedy, although it would be possible to stop the engine and wedge the race tight on the shaft by a strip of brass or tin.

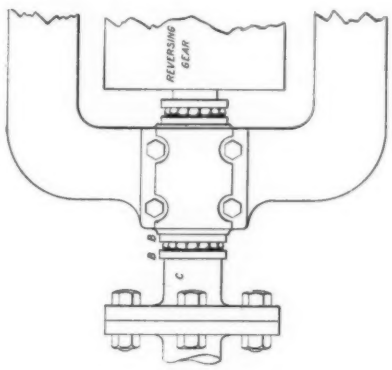


FIG. 1.—A COMMON ARRANGEMENT OF GO-AHEAD AND REVERSING BALL THRUSTS. THE FORMER USUALLY GIVES OUT FIRST.

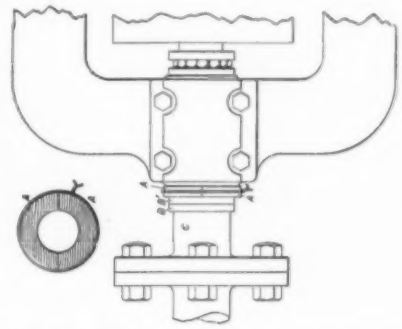


FIG. 2.—THE GO-AHEAD THRUST BLOCKED OUT BY THE WOOD DISC AA.

Leaky Valves or Piston

One of the principal causes of an engine not maintaining its speed is insufficient compression. The defect must be looked for in the valves or piston. The valves may require grinding so that they do not leak, and a little fine emery or broken glass will soon work a fresh face on both valve and seat. It should not be worked backward and forward, but with a continuous circular motion.

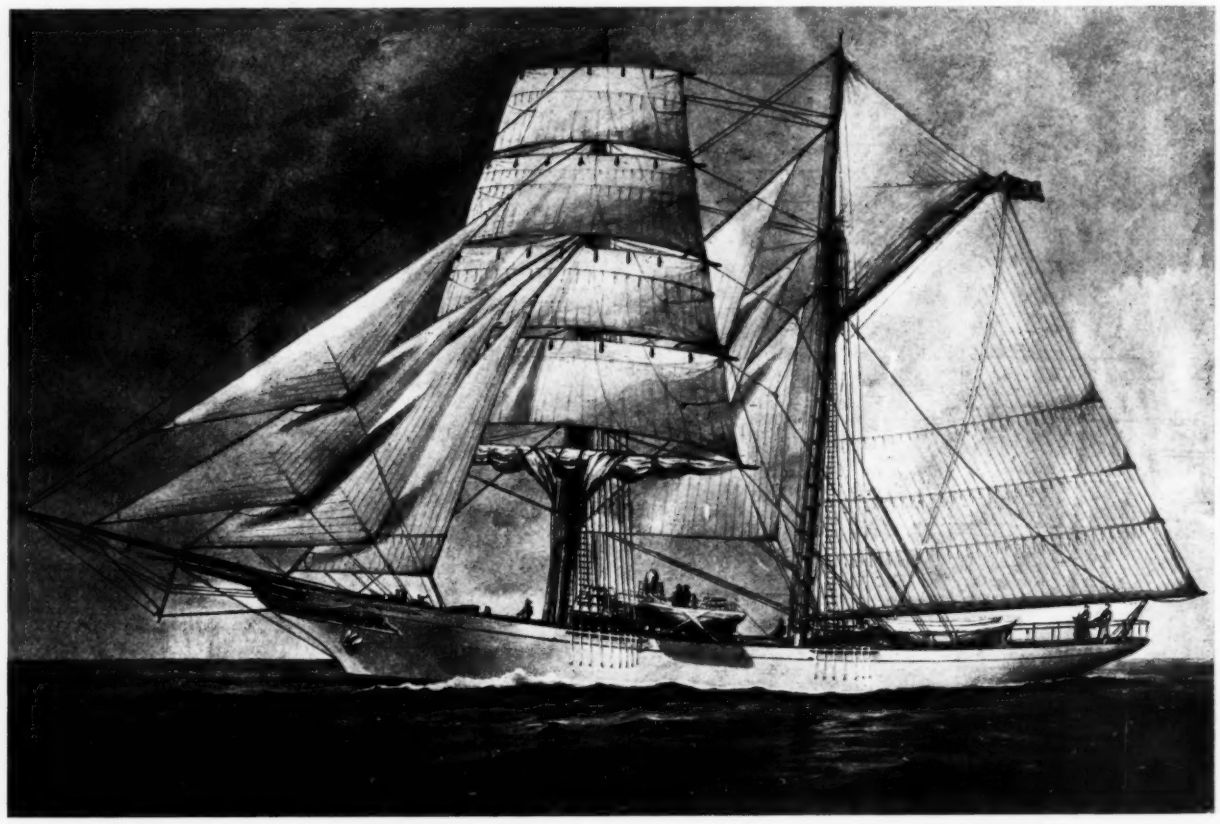
If the rings are defective and it is necessary to put in new ones, you must uncouple the connecting-rod end and carefully withdraw the piston on to wood blocks laid in the engine bed. From this point it can be lifted on to the floor. Set it up on end, when you can remove the rings by inserting pieces of thin sheet iron—say four in number—about ¾ inch wide under each ring, and slide the rings off. The ring nearest the vaporizer will generally give out first; it is exposed to a higher temperature than the others, and will consequently require renewing oftener. Before replacing the rings the piston and all rings should have every trace of carbon deposit removed from them; they can then be replaced in the same manner that they were removed.

Flooding the Carburetor

Outside of sparking troubles, there is probably nothing that makes a novice feel more helpless than having his carburetor go wrong. Flooding is a common cause of its trouble. When the motor stops, it is usually found, upon examination, that gasolene is leaking from the carburetor out of the float chamber plunger. The first thing to be done is to unscrew the top, or cap, of the carburetor with a screw-driver, first making sure that the cocks leading to the gasolene tank are closed. After getting at the float chamber, if the cork float is submerged, look at the hinge connecting the float to the valve to see if it is stuck or if any dirt particles have lodged in it, preventing the float from automatically closing the gasolene valve. If the hinge works all right the float should rise to the surface. It sometimes happens that the float binds along the side of the chamber. This may be caused by the carburetor not being set level, in which case it must be trued up with a wrench until the float rises and falls without touching the sides of the chamber. Another cause of trouble may be the wearing away of the coating of varnish on the float, which allows the cork to become water-logged.

A Gasolene Auxiliary Designed for Magnetic Surveys

HISTORIANS tell us that when Columbus made his memorable Western Voyage his sailors mutinied because, among other things, the needle of the compass no longer pointed to the North Star; which shows that this phenomenon was observed but not understood. Ever since then all mariners have had to put up with, what appeared to them, the senseless capers of the compass; for, while in one part of the ocean the needle points practically due north, in other localities the "variation"—as the mariner terms the angle of departure of the compass from the true north—is often several degrees; in fact, off the coast of Oregon and Washington a variation as high as 20 to 25 degrees is now observed, and in other parts of the earth still more. This variation does not exist only on the oceans, but is also encountered on land. At present, in the United States, the line of no variation—along which the needle points "true to the pole" or due north—begins in the eastern part of Lake Superior and Michigan and runs through Ohio about halfway between Cincinnati and Columbus, and after passing through the eastern parts of Kentucky and Tennessee it cuts through South Carolina and enters the Atlantic Ocean near Beaufort, S.C. For all places on the east side of this line the variation of the needle is west, and for all places to the west of this line the variation of the needle is east. As a general rule, the farther a place is located from this line in our country, the greater is the variation. Thus, in the northeastern part of Maine the compass points 21 degrees west of north, and at Vancouver 25 degrees east of north. It is known that the position of this line of no variation is not stationary, but has for many years been moving southwestward; how long this motion will continue is not known. It may be stated that the true North Pole and the North Magnetic Pole are not identical; in fact, the Magnetic Pole appears subject to considerable motion with the lapse of time, the actual path being as yet unknown on account of lack of data covering a sufficient period of time. There is little doubt, however, that the motion of the line of no variation in the United States bears some fixed relation to the motion of the Magnetic North Pole. Thus, the variation at a given place is constantly changing by an amount sufficient to be taken into account by those who use the compass in navigating a vessel.



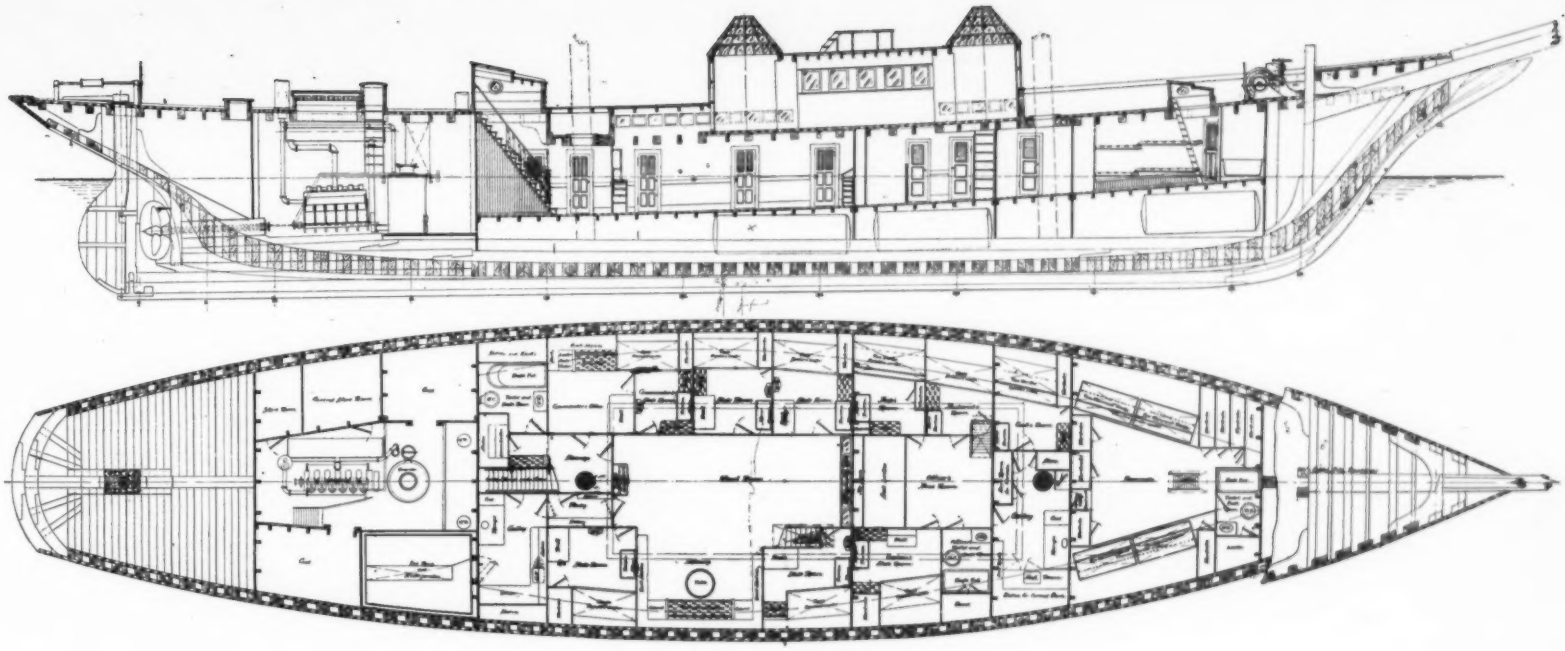
CARNEGIE, A GASOLENE AUXILIARY IN WHOSE CONSTRUCTION NO MAGNETIC MATERIAL IS TO BE USED.

Alexander von Humboldt, recognizing the importance of terrestrial magnetism, suggested that four times in every century an expedition of three ships should be sent out to examine, at as nearly the same time as possible, the state of the magnetism of the earth, so far as it can be investigated in those parts which are covered by the ocean. This plan of Humboldt's never came to a realization; and, instead, the work heretofore has consisted of more or less isolated and incomplete surveys independently undertaken by various nations, and distributed over a great many years. Not even for a single epoch has it been possible to construct magnetic maps on the plan of concerted action, to say nothing of the impossibility of drawing them for several epochs twenty-five or thirty years apart. Some notable surveys were made of the magnetic conditions over the oceanic areas, but the work covered hardly more than one-tenth of the navigable waters of the earth.

It was, therefore, high time that a systematic survey should be undertaken to determine the magnetic conditions over all the deep-water seas, and something over four years ago the Carnegie Institution, of Washington, undertook this task. Accordingly, a Department of Research in Terrestrial Magnetism was organized.

The first step in the ocean work was to make a magnetic survey of the Pacific Ocean, where little had been done since the notable voyages of the Challenger and of the Gazelle more than thirty years ago. Observations were made from the converted wooden yacht Galilee, which, between August 1, 1905, and May 31, 1908, made three successive voyages in the Pacific, tracing the Great Circle Route and zigzagging in and out of the islands. The total length of these cruises amounted to over 60,000 miles. This is only the beginning of the work.

With the experience gained with the Galilee, it was proved that, for the most economical, expeditious and satisfactory execution of this work, it would be advantageous to have constructed a thoroughly non-magnetic yacht, with auxiliary power and every detail arranged specifically for magnetic observations. The building of such a vessel having been authorized by the Carnegie Institution, of Washington, Mr. Henry J. Gielow, of New York,

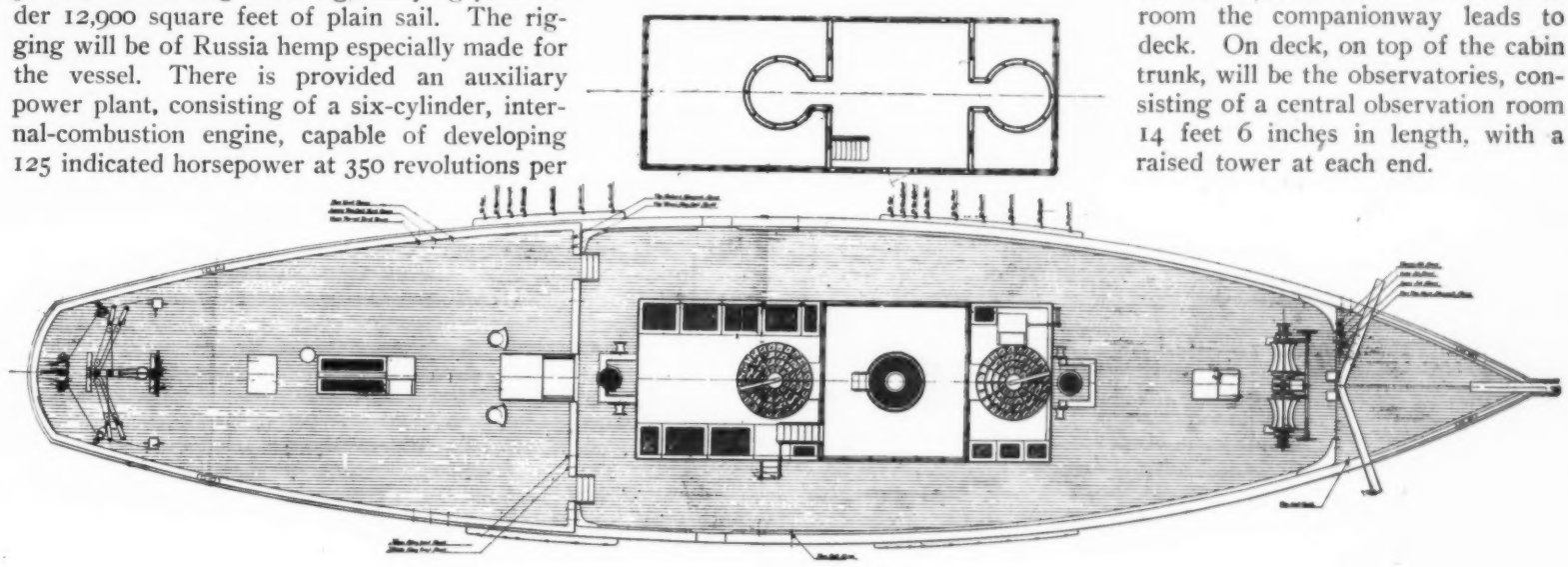


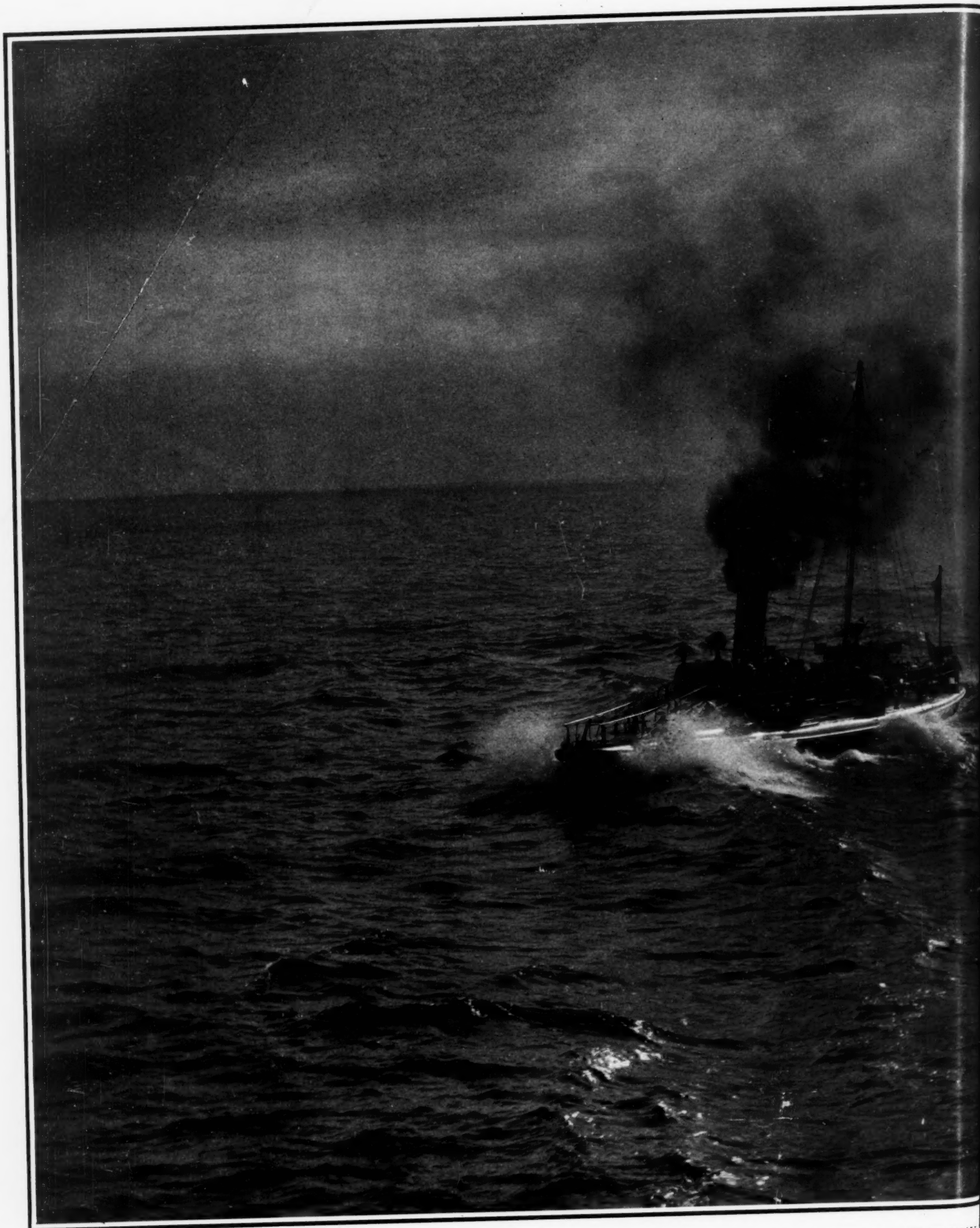
the well-known naval architect, was consulted, and the preparation of plans and specifications entrusted to him. On account of the requirements that the vessel be practically non-magnetic, many difficulties were encountered and overcome.

This vessel, to be named Carnegie, deserves more than passing notice, as it will be the first vessel in the construction of which iron and steel and other magnetic metals will practically have no part; for, with the exception of thin cast-iron liners in the cylinders of the bronze internal-combustion engine and the steel cams necessary for operating the valves—aggregating less than 600 pounds—there will be no magnetic materials used. As she is intended for ocean surveys, it was decided to combine the finish and workmanship of a yacht with the sturdy strength of a merchant vessel. The principal dimensions are as follows: Length over all, 155 feet 6 inches; length on load waterline, 128 feet 4 inches; beam, 33 feet; depth, 12 feet 9 inches, with a mean draught of 12 feet 7 inches and a displacement of 568 tons with all stores and equipment on board. Her lines are fair and easy, running in an unbroken sweep from stem to stern. The hull will be constructed according to the scantling requirements of the American Bureau of Shipping for merchant vessels of equal tonnage. The frames will be of oak; planking of yellow pine, and the deck of Oregon pine. The fastenings will consist of locust tree nails, copper and Tobin bronze bolts and composition spikes. All metal deck fittings, metal work on spars and rigging, will be of bronze, copper and gun-metal. The vessel will have full sail power, with a brigantine rig, carrying just under 12,900 square feet of plain sail. The rigging will be of Russia hemp especially made for the vessel. There is provided an auxiliary power plant, consisting of a six-cylinder, internal-combustion engine, capable of developing 125 indicated horsepower at 350 revolutions per minute, which, driving a feathering propeller of special design, will give a speed of six knots. With the exception of the thin cast-iron cylinder liners and the steel valve cams, the engine will be constructed of manganese and other bronzes. The shaft will be of Tobin bronze, and the propeller and its feathering gear will be of manganese bronze. The engine will be operated by gas generated in a producer-gas plant having a capacity sufficient to gasify 130 pounds of anthracite pea coal per hour. The bunkers will hold 25 tons, which will give her a cruising radius of two thousand miles.

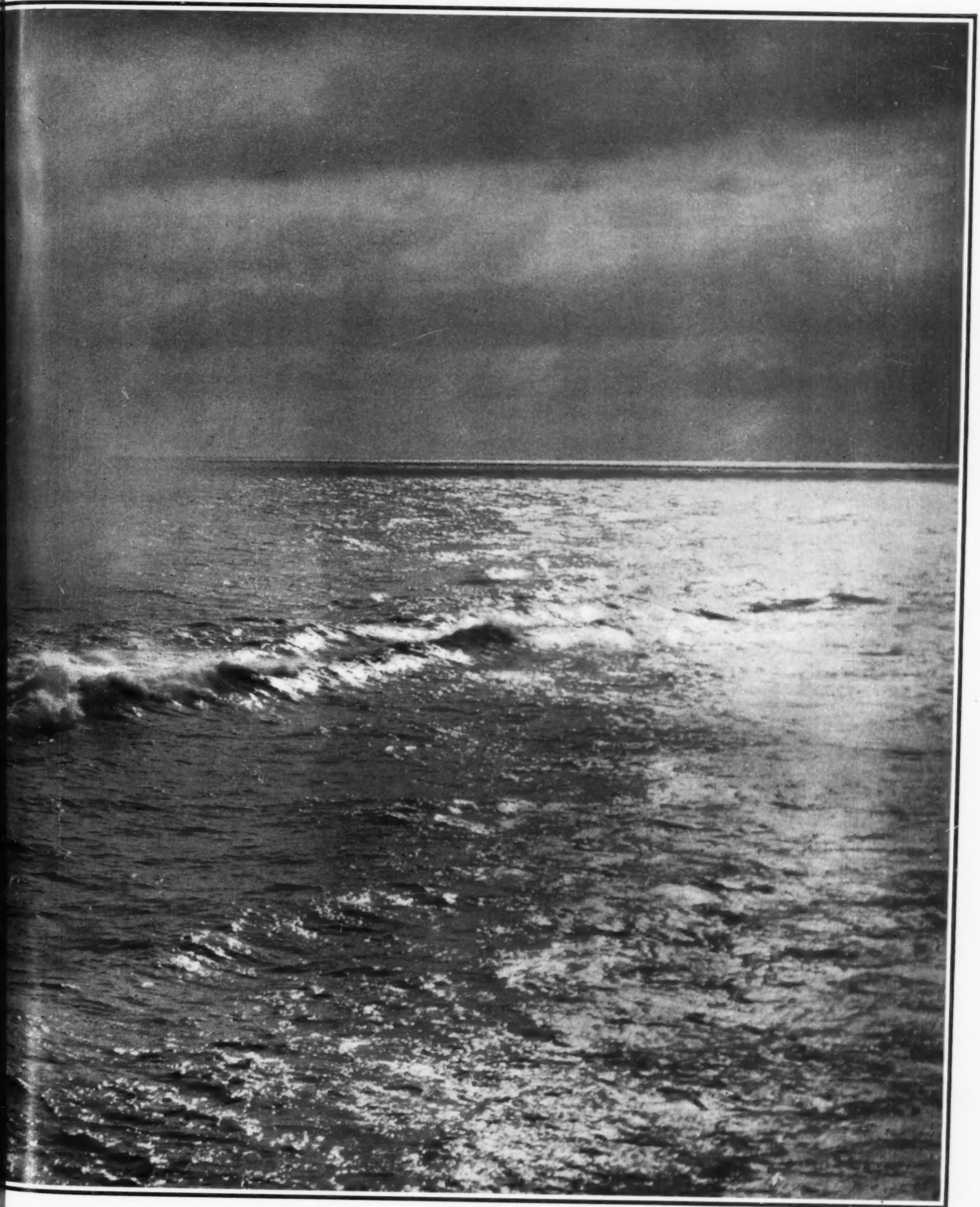
The living quarters are all below, ventilation and light being obtained by means of a cabin trunk on the main deck, 42 feet 8 inches in length. The hull will be subdivided into seven watertight compartments, so that, with even two compartments stove in, the vessel will remain afloat. Immediately aft of the collision bulkhead will be the forecastle, 19 feet 6 inches in length, fitted with berths for eight men. Next comes the crew's galley, 8 feet in length. Abreast of the galley, on port side, will be a double stateroom for the use of the cook and mess men. Aft of the galley, and occupying a space of 14 feet 6 inches, will be the officers' mess room, captain's and mate's staterooms, machinist's room and bath room.

Next abaft the officers' quarters are the accommodations for the scientific staff, occupying the full width of the vessel for a length of 38 feet 6 inches, these consisting of a ward room 25 feet in length by 11 feet 6 inches in width; three staterooms, and the commander's office on the port side, and two staterooms and a library on the starboard side. Aft of ward-room the companionway leads to deck. On deck, on top of the cabin trunk, will be the observatories, consisting of a central observation room 14 feet 6 inches in length, with a raised tower at each end.

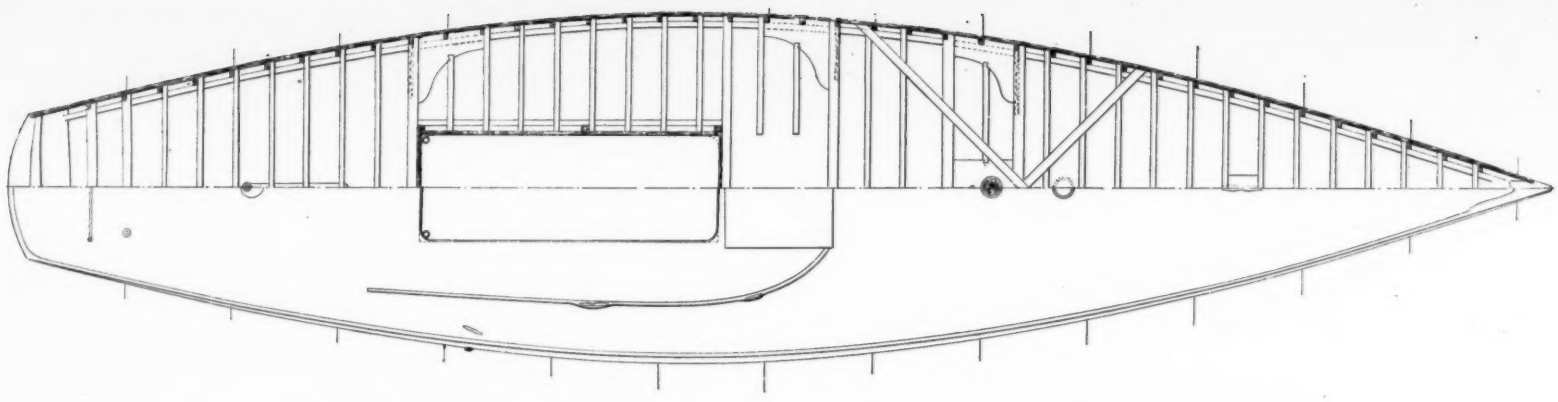




A VANISHING TYPE. THE NAVY HAS CLUNG TO STEAM IN SMALL



T NOW EVEN HERE THE GASOLENE MOTOR IS COMING TO THE FORE.



A New Class for Sound Racing

THE plans shown herewith are of a one-design, Class S boat, from the boards of Messrs. Cox & Stevens, of New York City. Fifteen of these boats are to be built for racing on the Sound and adjacent waters next season. The approximate dimensions are as follows: Length over all, 28 feet 11 inches; length on waterline, 19 feet; beam, 6 feet 9 inches; and draught, 4 feet 7 inches.

The boats will be given about 410 square feet of sail, and will have about 2,200 pounds of lead on the keel. The construction will be of the best, the frames being of oak, the planking of mahogany, all fastenings of copper, and the deck fittings and blocks of bronze.

It is expected that the boats will be raced at every opportunity, and, as they will be owned by leading Corinthians, should make a good showing.

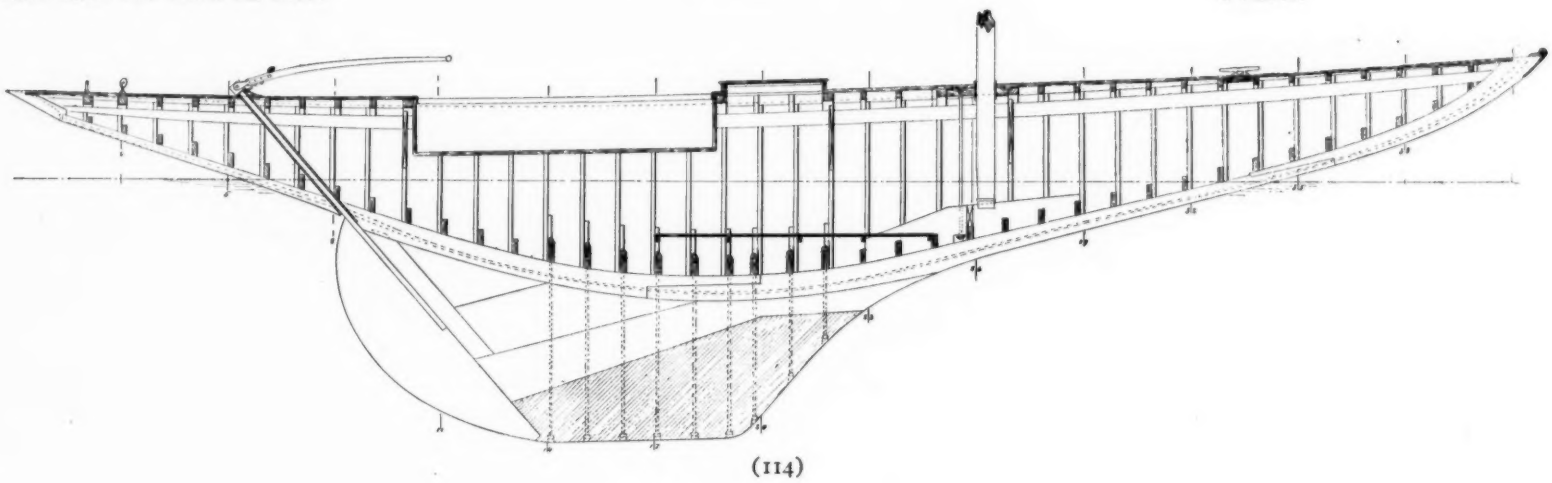
Among these owners will be Messrs. Howard C. Smith, Howard F. Whitney, F. L. Hine, H. W. Bucknell, Irving Cox, Parker D. Handy, J. R. Maxwell, Jr., H. L. Maxwell and H. N. Adams.

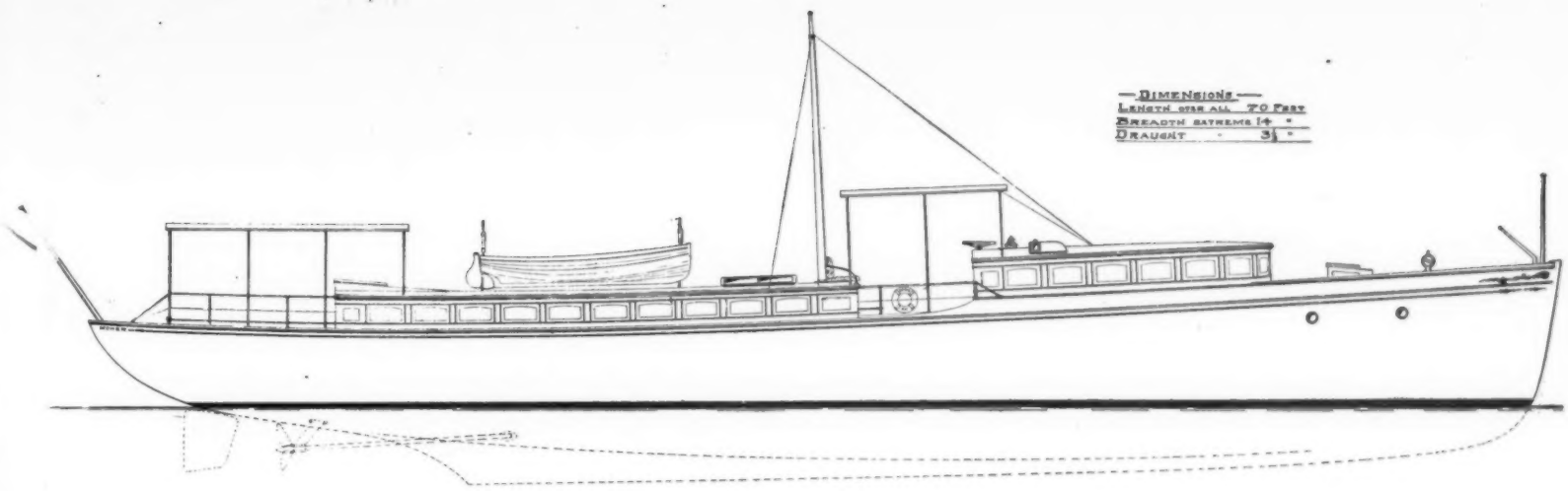
The designers purposely held back the work on these boats until the final decision of the Committee on Measurement was reached, and worked with the intention of turning out the best possible boat under the new rule. Comparison with last year's craft shows the effect of the new rule most plainly in the increased fullness of the ends. In the forebody this is most noticeable, the hollow water lines and hollow deck lines that have been seen in recent creations being replaced by more rational forms, producing a much abler craft, while in no way lessening, probably, their chance of success in racing under the new measurement.

The plans show a boat resembling somewhat the class Q boats, although smaller, and, from the number being built, they should furnish as good sport as that well-known class.

They are out-and-out racers, having no cabin accommodations, though there is a hatch, giving access to a cuddy below, with ample storage space for light, sails, oilers, etc.

The cockpit well is very shallow, and there is ample deck room—a good point in a racer.





A 70-Foot Cruising Power Boat

THE 70-foot power cruiser shown in the accompanying plans and now being built from designs by Charles D. Mower for A. B. Cartledge, Esq., of Philadelphia, will prove a handsome addition to the power-boat fleet of 1909.

Especial attention has been given by the designer to the comfort, safety and convenience of the owner and his guests, and the cabin plan shows a carefully laid-out arrangement which combines many excellent features.

The main saloon is under the forward deckhouse, and is unusually large for a boat of this size. There are the usual sideboards and lockers, and two wide transoms, which can be made into berths if occasion should require it. Aft of the saloon, and connecting with it on the port side, is the galley, which is large and conveniently arranged.

The main companionway from the bridge deck comes down into a small vestibule opening into the saloon, and also into a forward lavatory on the starboard side. The sleeping quarters are all aft, and consist of an after cabin, containing two berths and two extension sofas. Two single staterooms, with the usual furnishings, open off this cabin. There is a large lavatory, and ample locker and closet space is provided. The crew's quarters are in the bow, in a large, well-ventilated forecastle.

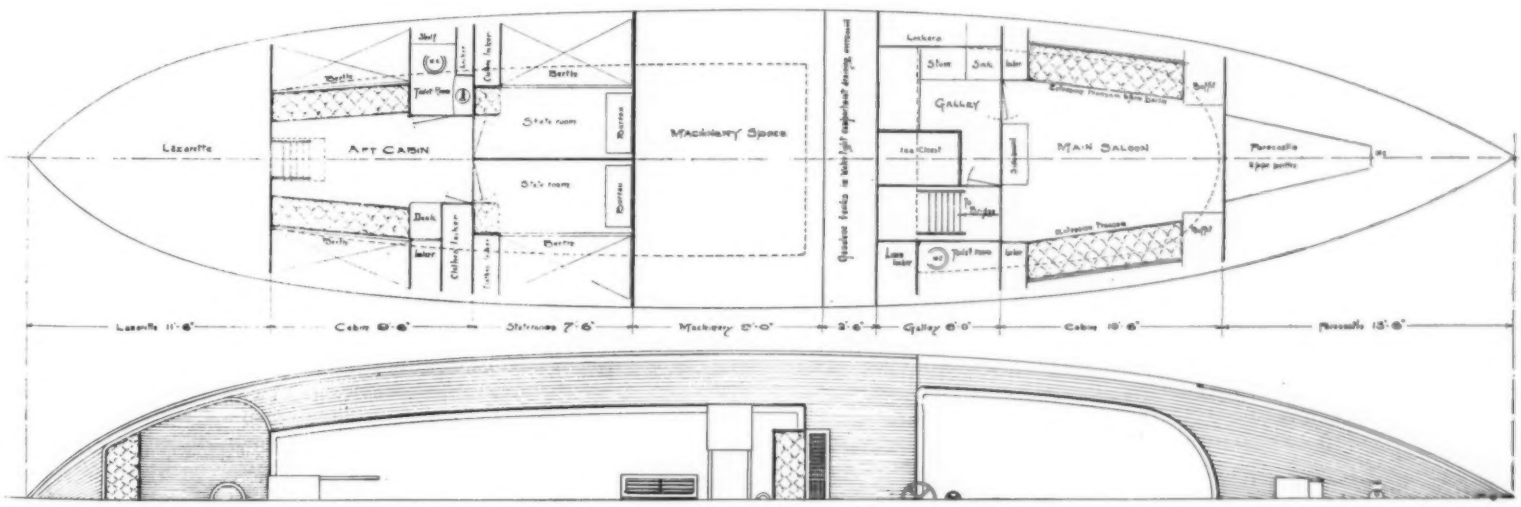
A noteworthy feature of the boat is the arrangement of the engine room, which is entirely cut off from the rest of the boat by watertight bulkheads. The gasolene tanks are in a watertight compartment at the forward end of the engine room, which is fitted with scuppers, so that any leakage or overflow of gasolene will be carried overboard.

The power equipment will consist of two gasolene engines of 30 horsepower each. They will be of the four-cycle type of four cylinders each, and will develop their power at 375 r. p. m. A complete electric lighting outfit will be installed in the engine room, and the entire plant will be thoroughly up-to-date in every detail.

The yacht will be steered from the bridge deck aft of the forward house. The deck arrangement is excellent, and shows the result of practical experience on the part of the designer. The forward deck has only a slight crown, so that anchors can be handled without danger of the crew getting overboard. The passage on either side of the forward house is fairly narrow, so as to give all the room possible in the saloon, while the deck space on either side of the after house is wide enough to allow a good passageway from bridge deck to cockpit. The cockpit aft is a shallow one, with a wide seat across the after end. Two boats will be carried in davits, the usual dinghy on the starboard side and on the port side a specially designed speed launch equipped with a high-speed engine and capable of a speed of 18 miles per hour. There will be a signal mast just aft of the bridge deck awning.

The specifications call for a somewhat heavier and much stronger hull than is usual in power craft of this size, and the designer has prepared unusually complete construction plans, so that the owner's requirements in the matter of strength will be faithfully carried out.

The dimensions are: Length over all, 70 feet; length water line, 63 feet 6 inches; breadth, extreme, 14 feet; draught, extreme, 3 feet 6 inches; freeboard, bow, 6 feet 6 inches; freeboard, least, 3 feet 8 inches.



EDITORIAL

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Tinkering with the Rules The London "Field" takes a fling at us for the recent change in the measurement rule in particular, and for our tendency, in general, to meddle with existing rules. Taking into consideration the fact that the "Field" does not appear to be fully informed as to the facts of the case—believing, as they do, that the changes are more radical than is really the case, and that the restrictions at which quarter-beam measurement aimed have been entirely eliminated—there is still much truth in their stricture. They deprecate the constant framing and tearing apart of rules that have been in existence, at best, but a few years, making the claim that three or four years—which seem to be the limit in this country for the trying-out process—is not a long enough period for a well-formulated set of rules to stand. They point out that, in adopting their International Measurement Rule in 1906, it was established until the end of 1917 upon a solid rock.

That this constant tinkering works a hardship on the man who, in good faith, builds a boat under certain provisions, only to have those provisions swept away because someone comes along and succeeds in building a boat under the letter, but not the spirit, of the rules as laid down that will beat everything in her class, no one will deny. The effect is not hard to foresee. It cannot fail to have a detrimental effect on yacht building (in fact, are we not being brought to a realization of the effect at the present moment?), as but few will have the hardihood to sink money in a boat of any size that may be legislated out of usefulness in a very few years. In framing a set of rules some protection should be afforded those who build under it, other than the formation of a handicap class, however beneficial that may be in itself. As a noted designer recently put it, "Rules have flourished to the detriment of yacht racing."

Power Boat Development The last few years have seen a great change in motor-driven craft—a change which is undeniably for the better. After the advent of the internal-combustion engine it seemed for a while, owing to the average American's desire for speed at any cost, as if the development would be along the line of flimsy, lightly-built hulls, utterly unsuited for any but the most sheltered waters. It was not until naval architects got a finger in the pie and began applying the lessons they had learned that the hulls began to take shape at all consistent with seagoing qualities.

Probably nothing has served to mould this development along right lines more than long-distance racing over outside courses, of which the New Rochelle-Marblehead race was the forerunner. The Bermuda race, the numerous long-distance cruising races of the Great Lakes and Pacific Coast, have all done their part towards awakening the power-boat man to a realization of the possibilities of the gasolene cruiser. We have only to compare some of the entries of that first New Rochelle-Marblehead race with the boats that started this year to see the strides that have been made. One wonders now how some of those earlier boats ever got over the Shoals and around the Cape. The value of just such races is in the kind of hull they develop and the type of engine they produce, seaworthiness being the requisite in the one and reliability in the other. The light-weight, high-speed, delicately-adjusted engine has no more place in an event of this kind than the long, knifelike, thin-skinned hull has in a race across the Western Ocean.

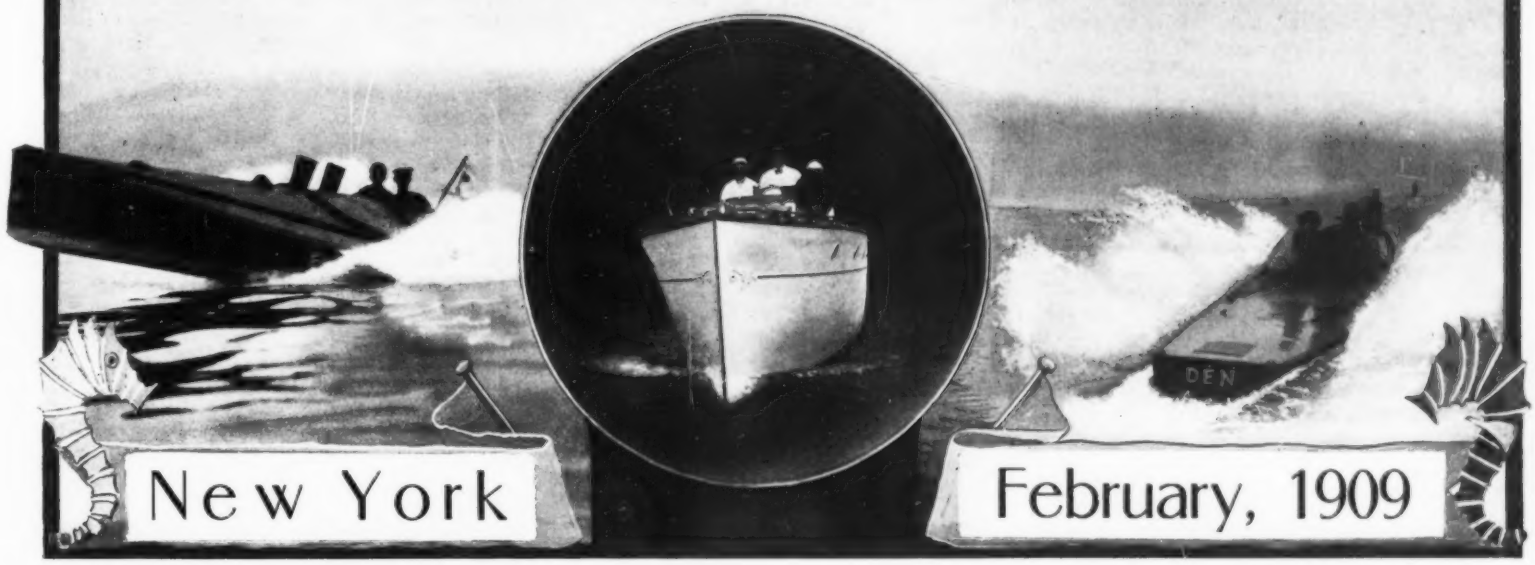
This desire for more extended cruising than sheltered waters afford having produced a boat in which the power man is beginning to have enough confidence to tackle courses clear of headlands, there is no reason why the entry lists of long-distance races should not fill better than they have in the past While there are many to whom the discomforts of such a proposition act as a deterrent, there are plenty of others to whom outside racing, with its excitement and the opportunity it offers for judgment and skill in both boat and engine handling, should appeal strongly. With the type of cruiser now in use we fail to see why so few entries are obtained for outside events. In the Atlantic Yacht Club's Fire Island race, only 73 miles in length, but two starters could be scared up, and in other contests of the kind entries are equally scarce and hard to get. We are not advocating entering such contests with boats unsuited to the work—this would be the height of folly, and might be productive of a blow to ocean racing from which it would be hard to recover—but the type of cruising boat under 50 feet in length that is now produced should, if properly handled, be able to negotiate any course along the coast, and there is no reason why their owners should hang back.

In this connection we understand that there bids fair to be a new long-distance race for power boats this summer over an ocean course,—if plans mature,—the Colonial Yacht Club having offered a challenge trophy for such an event. It is for boats of a somewhat larger size than are eligible for the Marblehead race, and, in a way, it should fill a gap between that event and the Bermuda contest. Much depends upon the selection of a course, which is to be from 400 to 600 miles in length, we understand. There are plenty of good courses on the coast that should prove attractive to men with boats under 50 feet in length, and it is to be hoped that the interest in the event will not be marred by the slimness of the entry list.

Motor Boat Legislation No word has yet come from Washington regarding any legislation affecting motor boats that the Congressional Committee on the Revision of Laws Relating to Safety at Sea has seen fit to recommend. Though we are still in the dark, we believe that the Committee will take a rational view of the matter. The Marine Supplies Association has submitted a very comprehensive list of recommendations as to equipment and regulation, which we believe, if adopted, will prove satisfactory to both the government and the motor-boat owner. This schedule of requirements was carefully formulated with a view to the needs of the varying sizes of craft, and with a knowledge of their capacity to accommodate the size of equipment recommended for each.

If these recommendations are accepted, the motor boat fraternity throughout the country will have no reason to complain, but can view with satisfaction the reasonableness of the legislation. As to the question of requiring licensed engineers on motor-driven craft, the matter seems at present to hinge on the minimum size at which such license is necessary. That it will at all affect the man whose boat is of a size such as not to require a paid crew seems, at present, improbable.

Motor Boat Show Supplement



The New York Show

FOREWORD

By John J. Amory, President National Association of Engine and Boat Manufacturers

Of the building of motor boats, like the making of books, there is seemingly no end. As in days gone by, the average reader was content with his Dickens, Scott or Cooper, so was the yacht owner with his old-fashioned round-counter, straight-stem, steam or naphtha launch. But in these days of new, light literature, books fall from the binder's press like leaves in Vallambrosa, and such a multitude of plans come from the launch designers, with such radical changes, both for good and bad, that if that most ancient of boat builders, Noah, were alive, he probably would wonder whether or not we were anticipating another flood.

The Motor Boat Show, which will open at the Madison Square Garden on February 16, and continue for a week, will offer the finest opportunity that has yet been afforded to observe the progress made in recent years, both in yacht and launch designing as well as in the development of the gasolene engine. This show, being held under the auspices of the National Association of Engine and Boat Manufacturers, will call out, probably, the largest and most complete exhibit of motor boats ever shown in the world, and the greatest variety of makes and types of gasolene engines that has ever been assembled. It will, therefore, prove a great attraction to all who are either engaged in the manufacture or interested in the sport. The benefit of such a show is just as great to the designer and builder as to the buyer, for in no other way can the spirit of competition be so aroused, and in no other manner can that comparison be had which incites to new ideas and efforts on the part of the builder.

Outside, possibly, of the automobile, there is nothing in this age of pleasure vehicles that interests so large a number of people as the motor boat—and the motor boat certainly is giving the automobile a close run in popularity at the present time.

From all sections of the United States—from Canada to Mexico, and even from Central and South America—will come to this Motor Boat Show, men who are desirous of keeping in touch with the great progress that is being made from year to year and the efforts that are being put forth to insure those elements of safety, simplicity and economy that make for the thorough enjoyment of any sport.

THE OUTLOOK FOR 1909

Never before in the history of the country has the outlook for the future of motor boating, both in a sporting and a business sense, been so bright as now, at the time that this issue of YACHTING goes to press. The wave of returning prosperity is rolling in, and high on its crest is carried the welfare of those who are interested, either for pleasure or business reasons, in the success of the power craft.

Not only are new men coming into the sport, in larger numbers than ever before, thereby increasing the number of craft that will float on American waters during the coming season, but skippers of one or more years' standing, temporarily deterred by last season's panic from improveing their equipment or purchasing larger craft, are already making up for their self-denial of the previous season by arranging for larger boats with higher power or more completely outfitted with the many accessories that add so much to the comfort and pleasure of the cruise or the afternoon run.

And never before has the racing man, the cruising man, or the plain ordinary, every-day boat owner been catered to as he will be during the year of grace 1909 by the manufacturers of engines and equipment, and the builders of boats. During the past year every manufacturer seems to have worn his thinking-cap, and the concrete results of the thought that has gone into this year's progress, has taken shape in such advances in detail, design, durability and economy—both in first cost and maintenance—of everything from hull to binnacle fitting, that he who is not either an actual or a prospective skipper of a power craft is indeed one to be pitied. Just how deeply can best be estimated by a perusal of the following pages, the best and most complete advanced description of a motor-boat show ever published, and after reading these pages the motor-boat enthusiast will not rest until he has seen what the show itself has to offer.

The development of the power boat has been so marked during the past two years that one who has not kept abreast of the improvement will find cause for surprise. Not only has the boat itself changed for the better, but the gasolene engine also show a marked superiority over the product of only a few years ago. As in the automobile, reliability has been the keynote, and the result in this direction is rapidly approaching perfection.

The Exhibits

A 20-Mile Runabout, a 45-Foot Cruiser, a 12-Mile Power Launch, a 25-Foot Yacht Tender, an 18-Foot Yacht Tender, and a Reversing Engine

The exhibit of the Gas Engine & Power Company & Chas. L. Seabury & Co., Con., of Morris Heights, New York City, will be a particularly good one this year, and will show many boats which are now on the high tide of public favor.

In their space they will exhibit a 45-foot high-speed seagoing runabout, which has generous freeboard, good beam and a speed of 20 miles an hour. The hull is planked and finished throughout in teak wood, varnished inside and outside. Motive power consists of a six-cylinder, four-cycle 6 x 6 Speedway engine, developing 60 hp. at 750 revolutions per minute.

The principal dimensions are 45 feet over all, 43 feet 6 inches on the waterline, 6 feet 6 inches beam and 2 feet 7 inches draft. It has a round bow and "Torpedo" stern, which completely protects the after end of her rudder.

The forward deck is 11 feet 8 inches in length, and under this is a 25-gallon auxiliary supply fuel tank. At the forward end of the cockpit are two hinged hoods, covering the motor, aft of which is the operator's space, separated by a bulkhead and a glass wind shield from the after cockpit. The seating arrangements of the after cockpit are provided for by two 'thwarf-ship transoms and four wicker arm chairs. The rear end of the cockpit is square, and under the after deck is a 100-gallon fuel tank.

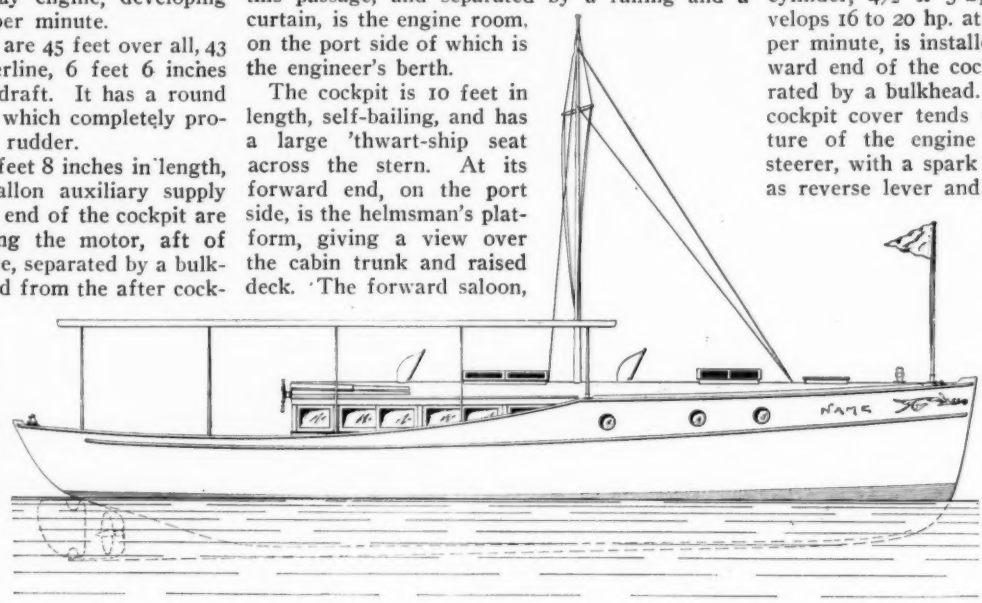
An automobile steerer is fastened to the bulkhead aft of the engine compartment, and reverse lever and control mechanism are brought right to the hands of the engineer. She is a very pretty craft, and her seagoing ability is a feature which will render her extremely popular.

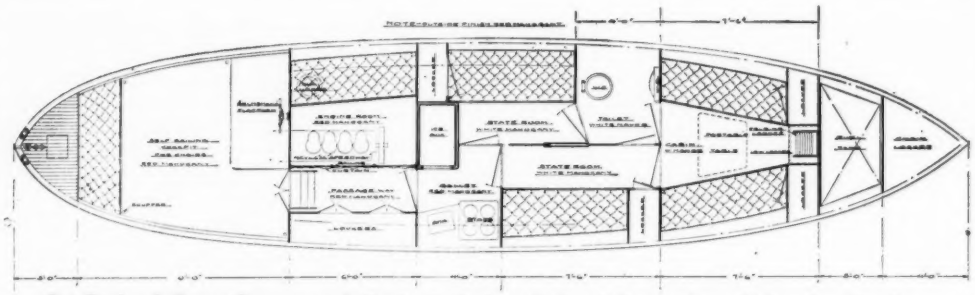
For one who cares less for high speed than for ability to make a prolonged cruise in comfort, the same company will exhibit a 45-foot raised-deck cruiser of the compromise stern type, which will undoubtedly prove one of the stars of the show.

It is 45 feet in length over all. 41 feet L. W. L., 10 feet beam, 3 feet draft, and the four-cylinder 6 x 6 Speedway 32-hp. engine, at 550 revolutions per minute, will give a cruising speed of 12 miles per hour—a particularly good rate for a craft of these dimensions.

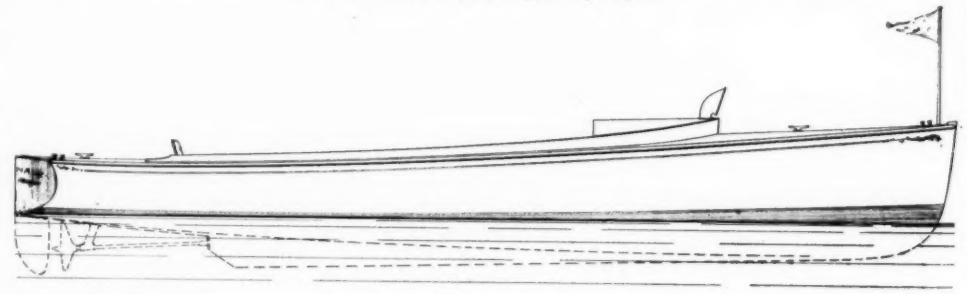
The raised deck forward has three port lights on each side. Just forward of amidships a narrow, raised cabin trunk runs aft from the break in the deck, under which are situated the engine room, galley and a portion of the staterooms. The extreme forward portion of the boat is occupied, as usual, by the chain locker, aft of which is the fuel tank of 200 gallons capacity; next comes the saloon, occupying the full width of the boat, with transoms on each side and two large lockers at the forward end. Between these two lockers a folding ladder leads up to a hatch on the forward deck. Aft of this cabin there is a toilet room on the port and a stateroom on the starboard side, both entered by swinging doors. Directly aft of the toilet room is a second stateroom, and aft of the starboard stateroom is the galley, with sink, stove and large ice box. From the galley a passageway fitted with lockers leads to the cockpit. On the port side of this passage, and separated by a railing and a curtain, is the engine room, on the port side of which is the engineer's berth.

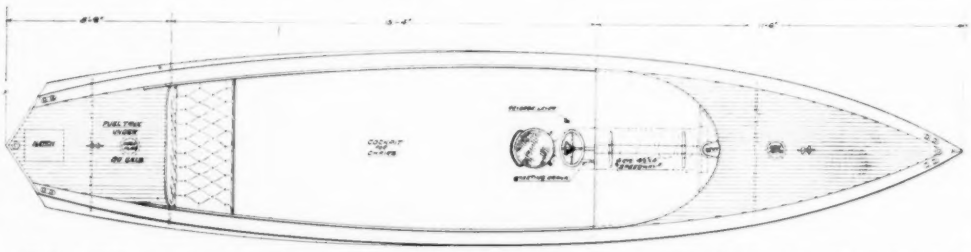
The cockpit is 10 feet in length, self-bailing, and has a large 'thwart-ship seat across the stern. At its forward end, on the port side, is the helmsman's platform, giving a view over the cabin trunk and raised deck. The forward saloon, staterooms and toilet room are finished in white mahogany, the balance of the boat in red mahogany. She carries a pole-mast for signaling purposes, and her cockpit is covered by a double blue and white canvas awning on metal stanchions. The reverse lever and controls to motor are placed near steering wheel, so that one man may handle her.





Gas Engine & Power Company and Charles L. Seabury & Co., 45-foot cruiser which makes 12 miles per hour with a 32-H. P. Speedway engine.





30-foot "V"-stern family runabout. Her 16-20-H. P. Speedway engine is under hood at forward end of cockpit, and gives a speed of 12 miles.

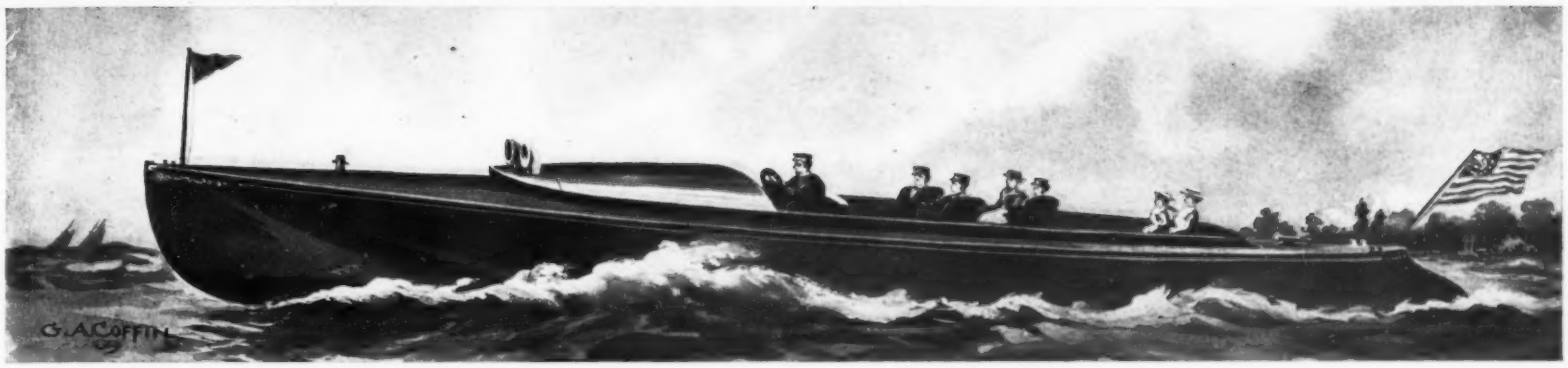
For the man who desires neither a speed boat nor a cruiser, but wants a runabout of moderate speed and generous carrying capacity, the 30-foot "V"-stern runabout which the firm will show will create considerable interest. It is 30 feet in length over all, 29 feet 6 inches waterline, 6 feet beam, and has a draft of 25½ inches. A four-cylinder, 4½ x 5-Speedway engine, which develops 16 to 20 hp. at about 550 to 650 revolutions per minute, is installed under a hood at the forward end of the cockpit, from which it is separated by a bulkhead. A ventilating cowl on the cockpit cover tends to keep down the temperature of the engine space, and an automobile steerer, with a spark and throttle control, as well as reverse lever and starting crank right at the engineer's hands, allows one man to control the boat with ease and safety. With the exception of a 'thwart-ship stern transom, the cockpit is left entirely free for chairs. The fuel tank, which is installed under the after deck, has a capacity of 50 gallons. The hull is cedar planked, copper fastened, painted white, while the decks, hatch over motor and interior finish is of mahogany, varnished. The stern is of mahogany, finished bright.

In addition to the boats mentioned the same company will also exhibit a very handsome mahogany motor boat of the yacht-tender type, equipped with four-cylinder, four-cycle, 4 x 4½-inch Speedway gasolene engine of 12 to 15 hp. This launch will be 25 feet long and 6 feet wide, with high freeboard, and will be especially adapted for rough-water service. Speed, 11 miles per hour.

One of the old reliable "Only Naphtha" launches, 18 feet long, 2 hp., will be exhibited. This boat will be cedar planked, lap-stroke, mahogany finished. with slat seats and grating floors.

A full line of 1909 model Speedway gasolene engines will also be shown.

If everything goes ahead as scheduled at the factory, it is probable that the show will be graced by a new reversing engine, a distinctive 1909 product, and the latest addition to the line of "Speedway" marine gasolene engines. This is a



20-mile, 45-foot Seagoing Teakwood Runabout. She is equipped with a 60-H. P., 6-cylinder Speedway engine, and is a wonderful combination of speed and staunchness.

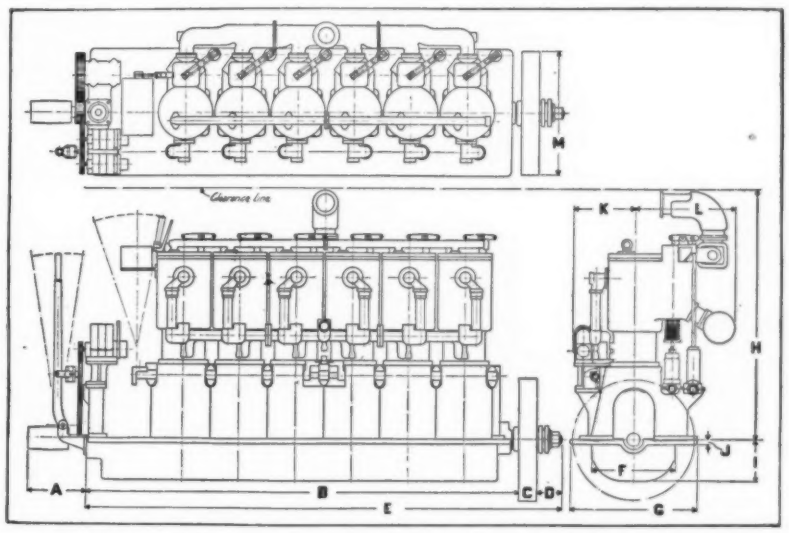
six-cylinder reversible motor, with 8½-inch cylinder bore by 10-inch stroke. This engine develops 150-brake horsepower at 600 revolutions per minute. The arrangement of valves is similar to that on the smaller Speedways, the inlet being directly over the exhaust, thus forcing the cool incoming gas over the exhaust valve head, keeping it cool. It has been found to be unnecessary with this arrangement, even on an engine of this size, to add the extra complication of water cooling the exhaust valve. The design of this engine permits both inlet and exhaust valves to be mechanically operated. This is accomplished by the use of two cam shafts, one for exhaust cams, the other for inlet cams. Only one set of cams is required for each cylinder, the same cams being used for both directions of rotation. The cam shafts are turned when it is desired to reverse the engine, so as to place them in the required position for either direction of rotation. This is effected by the movement of a hand lever, which operates a spiral sleeve. The spiral reverse is a modification of the well-known and successful gear used on the Seabury steam engines, manufactured by the same concern.

On the side of the engine, opposite to the main cam shaft, is another smaller shaft running the length of the engine. On this are two sets of air cams, one set for going ahead, and the other for going astern. By means of a lever, this shaft is given an endwise movement, bringing either set of air valves into action, or if left in the neutral position the valves do not lift. The movement of this shaft also opens or closes the main valve from the air tank as required. By means of the air the engine can be driven in either direction under full power until the normal ignition takes place, the air being admitted in all six cylinders during the working stroke. The two main control levers are located at the after end, together with two smaller levers for spark and throttle control.

The engine bed plate, of cast iron, is semi-circular in section, closed at the bottom and provided with semi-circular seatings for removable babbitted bronze shells for main bearings. These bearings can be replaced in an engine without lifting the crankshaft. To the bed plate are bolted the frame sections. These sections are box-shape, giving maximum strength for a given weight. The cylinders are bolted to the top of these sections. Cylinder heads are removable and provided with water circulation, the water from the cylinder entering the head by means of an outside connection. The exhaust pipe is water jacketed, being built up of steel tubing and malleable iron fittings. The circulating water, after leaving the engine, is passed through the exhaust pipe.

A small air compressor, driven by the eccentric on the main shaft, serves to keep the air tanks charged. The carburetor and inlet pipe are of special design, both being heated by exhaust gas. The carburetor has a gasolene reservoir, with an overflow, which is kept supplied from a float-feed tank by a gasolene plunger pump, the overflow being led back to the float tank. The float tank is placed as low as possible, and is fed by gravity from the main tank. The Bosch system of ignition, with two sets of magnetic plugs, is used; one set for going ahead, and the other for going astern. Forced feed lubrication is used throughout on all important bearings.

This engine, with others of the "Speedway" line, is built by the Gas Engine & Power Company, and Charles L. Seabury & Company, Consolidated, of Morris Heights, New York City.



Detail Diagram of the new Speedway Reversing Engine, which develops 150 brake-horse-power at 600 revolutions per minute.

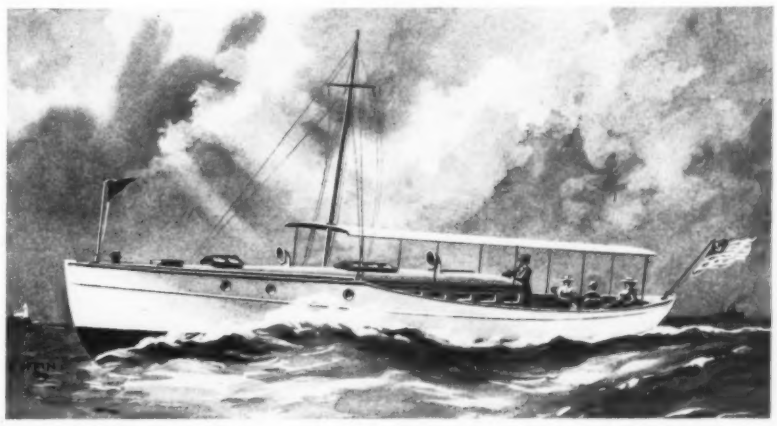
Of Interest to Both the Trade and the Engine Purchaser

In space No. 414, second tier, the Erie Foundry Company, of Erie, Pa., will have on exhibition an assortment of cylinder castings, both in the rough and machined. While this will be an extremely interesting collection to the manufacturers, it will prove of no little importance to the prospective purchaser of a gasolene motor, showing, as it will, by actual example, the many processes through which the rough casting must pass before it is ready for assembling in the finished engine. There will also be on exhibition several cylinders that are sawed through, in order to give an idea of the quality of the iron and the setting of the cores. A thorough study of such objects as these will go a long way toward giving the motor-boat owner a just appreciation of the quality of material and workmanship which enters into parts of his motor rarely subjected to his inspection after purchase.

For the Man Whose Family Enjoys the Water

The Fay & Bowen Engine Company, of Geneva, N. Y., will this year take particularly good care of the motor boat enthusiast who wants his family to share in his fun. They will show in Section R their 25-foot "special," built to meet the demand for a safe, comfortable family launch of modern design, and with an up-to-date outfit. She is 25 feet long with 5-foot beam; is roomy, staunch and safe, and, at the same time, is quite "classy" in appearance— a feature which has been in no small degree brought about by her radial stern and sharpness forward.

Her 7-horsepower, double-cylinder Fay & Bowen engine gives her an actual speed of 10 miles an hour—an extremely good showing for a boat of this type. She is planked with Southern white cedar, and her decks, sheer strake, plank sheer, coaming and entire interior finish are of mahogany, making her exceptionally handsome. Her stern seat runs right across the cockpit, and is provided with a comfortable lazy-back. The engineer's seat has also a removable lazy-back, while the space between the two contains removable slat seats running fore



The 45-foot, 12-mile Cruiser as she will appear when in commission.

and aft, which, when taken out allow space for four wicker chairs. There are lockers underneath all cross seats, and quite a generous amount of storage room is to be had back of the forward bulkhead, underneath the tank. The engine occupies the forward portion of the cockpit and has a duplicate set of spark and throttle controls, so that the boat may be steered and controlled from the seat either forward or aft of the engine.

In addition to the boat just described, the Fay & Bowen Engine Company will also have on view a line of their regular gasolene engines, kerosene engines and high-speed motors for racing craft.

The Evolution of a Sterling Product The exhibit of the Sterling Engine Company, of Buffalo, N. Y., in south end of spaces J and K, will prove a most interesting object lesson of the remarkable development of marine engines during the past few years. In this booth the Sterling Company will show their latest 1909 types in speed engines, semi-heavy duty and heavy-duty engines.

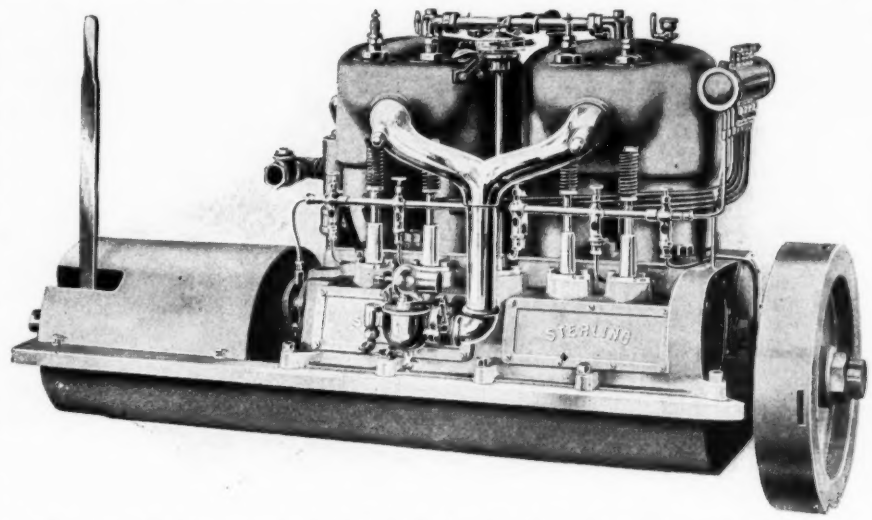
Their exhibit will consist of one 12-horsepower, heavy-duty, two-cylinder, four-cycle engine, known as their Sterling Fisherman, and designed for fishing boats and small working boats; a 40-horsepower heavy-duty engine, four-cylinder, four-cycle, and a 60-horsepower, six-cylinder, four-cycle. The Sterling Engine Company equip their 40 and 60-horsepower engines with either jump spark or make-and-break ignition, and furnish with either of the above systems an auxiliary set of spark plugs from storage battery, thus giving the above-mentioned engines double ignition, which makes them ideal for cruising or working boats.

They will also show in their type B engines an 18-25-horsepower, four-cylinder, four-cycle; a 30-45-horsepower, four-cylinder, four-cycle, and a 35-55-horsepower, six-cylinder, four-cycle. These are built either with aluminum or iron base, and can be used for semi-heavy duty or speed work. The lower rating is for semi-heavy duty work, and the engines develop the lower rated power at 600 revolutions and the higher power at 900 revolutions.

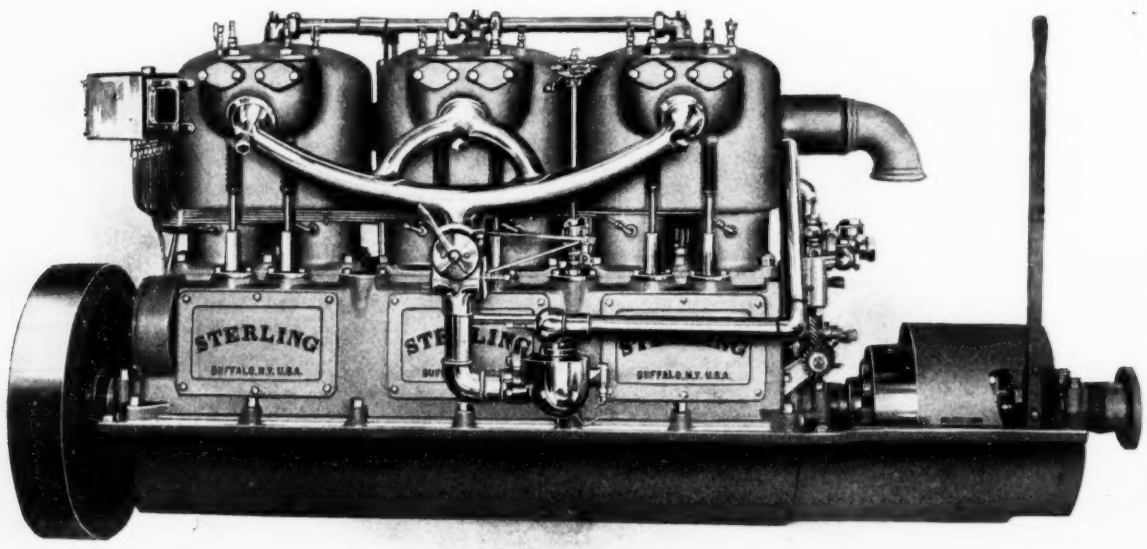
The type B engines are especially adapted for cruising work, where excessive weight would be an objection, as they can be set up in pairs for turning twin screw. The Sterling engines are all high grade in construction, showing refinement in all details. They will bear close inspection, for they show heavy working parts, large bearing surfaces, and they will stand up under the most adverse conditions.

As an instance of the progress which the Sterling Engine Company has made in the last four seasons, we show herewith a Sterling engine as built in 1905, and two illustrations of their latest 1909 models. By a comparison of the old and new models, the radical change in general design is at once apparent, the later product giving an impression of symmetry of design, compactness, strength and power. It will be noticed that the inlet connection on the 1905 model shows eight bolts, while the engine of 1909 has but two. A similar reduction of parts has been made in the exhaust connections, which, in the 1909 model, has two instead of eight in the 1905. In the water connection on the modern type the bolts have been reduced to two instead of eight, as in the 1905 model. In 1905 all Sterling engines were built with single cylinder. In the engines exhibited at the show the cylinders are cast in pairs, and are made of a special, hard, close-grain grey iron, the cylinder proper being chilled in order to present a very hard surface. By casting the cylinders in pairs, a larger cooling surface is provided, and the construction is greatly simplified by the reduction of the number of parts, while the appearance is greatly improved.

A decided change has been made in the oiling system, which in the 1905 models was on the gravity principle, whereas the new Sterling is equipped with an automatic system. In the latest models the lower base of the engine is provided with partitions about 2 inches in height separating each connecting rod. At the rear of the engine is a rotary pump, from which a tube runs down into the oil pit in the lower base. On starting the engine oil is taken by this pump from the oil pit into the feed pipe, through which it flows into a small reservoir. At the point where it enters the reservoir the pressure is held on the main feed pipe by means of a small valve. The oil in the reservoir is carried through the sight-feeds, supplying a full stream to the bearings. From the main bearings the oil is carried through the oil duct in the crank shaft to connecting rod bearings, thus insuring connecting rod lubrication. The partitions in the lower base are of sufficient height to give a slight splash lubrication, and a steady stream of oil is carried to bearings while the engine is running. The surplus oil from the feed bar is carried to the small reservoir on front of engine, rises about half way, and overflows through a pipe onto the cam shaft gears into the lower base; then flowing over the different partitions which form settling basins, it is carried to the oil pit at the rear, whence the oil is once more started on its lubricating journey by means of the pump. The sight-feed at the front of the engine provides lubrication for the cylinders.



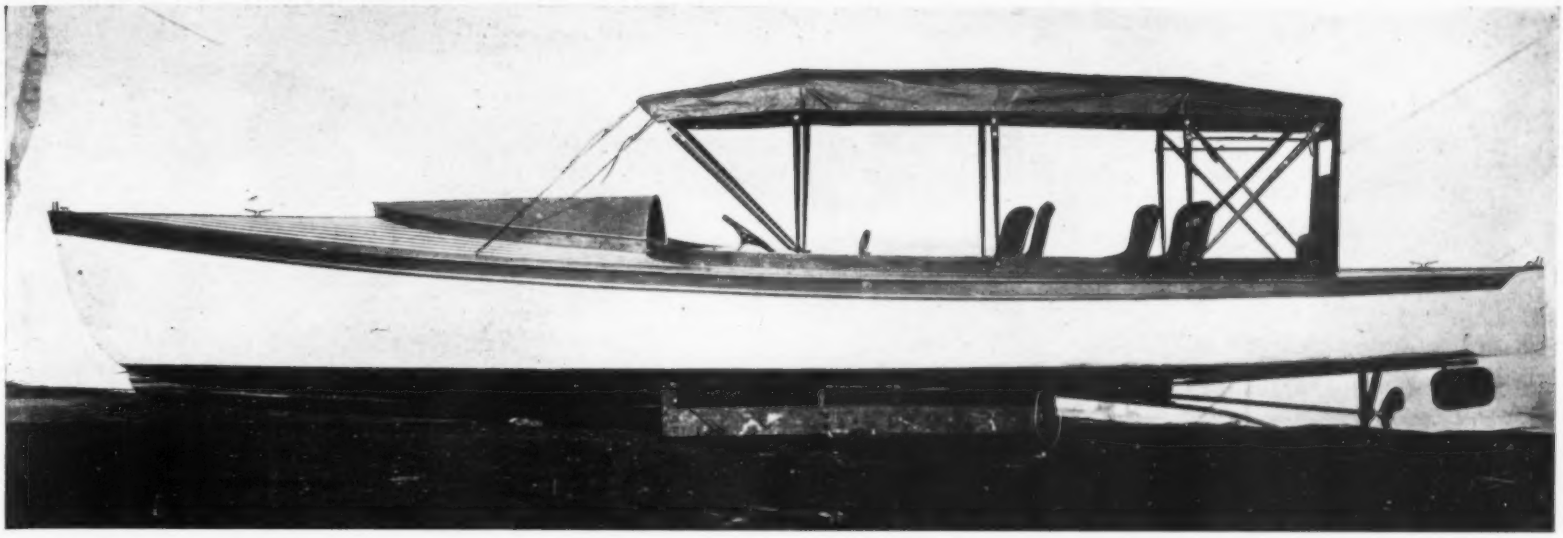
Sterling four-cylinder, four-cycle, 30-45-H. P. Engine, Model B. Its normal speed is 650 r. p. m.



60-H. P., six-cylinder, four-cycle, heavy-duty Sterling Engine, whose speed ranges from a minimum of 150 to a maximum of 600 r. p. m.

While in the 1905 engines the base was opened and the cam gears exposed, in the 1909 base the gears are entirely enclosed. The 1909 engine base is compact, and provided with an extension under the lower half that receives the reverse mechanism. A groove running around this lower base catches any oil which might ooze from the engine into a compartment at the rear of the engine, designed for this purpose. An important change in the 1909 engine is the location of the circulating pump, which is of the plunger type, with piping practically eliminated, the pump being bolted to the fittings fastened on the inlet of the cylinder.

On the heavy-duty models designed for work boats, cruisers and the larger yachts, the water cooling, bilge and air pumps are fastened securely to the upper and rear end of the crank case. All pumps are so alined as to be driven by a common shaft, which extends across the base



New 26-foot Mullins Runabout, designed by Whittelsey & Whitaker. She is equipped with a 25-H. P., three-cylinder Ferro Engine and a Mullins under-water exhaust.

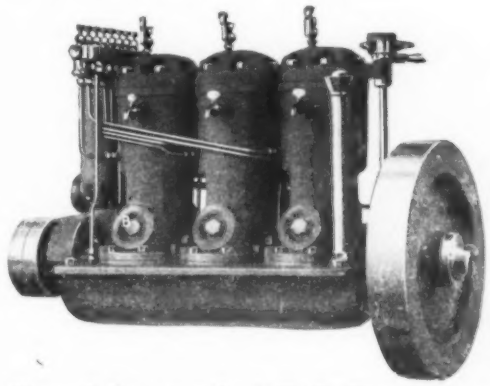
at right angles to the cam shaft, and is driven by hardened steel spiral gears completely housed. To this shaft the respective pump eccentrics are attached. Both water and bilge pumps are provided with hollow connecting rods, through which grease is forced, lubricating the wrist pin and pistons.

Up-to-Date Models of a Well-Known Builder

Spaces P and Q will contain an attractive line of 1909 craft, which the W. H. Mullins Company, of Salem, Ohio, have prepared for the coming season. First among them may be mentioned their 26-foot model (designed by Whittelsey & Whitaker, of New York), equipped with a 25-horsepower, three-cylinder, two-cycle Ferro reversible engine, provided with Mullins silent under-water exhaust, reverse gear and one-man control. The engine is placed forward in a special compartment under a steel hood, and is separated from that part of the boat in which the passengers will be seated by a handsomely paneled oak bulkhead, on which is placed the whole control of the engine, including Mullins' rear-starting device, spark and throttle levers and reverse gear, the whole control being conveniently grouped within a radius of 15 inches. The cockpit of the boat will be left open for wicker chairs. This boat will be equipped with a folding auto top, fitted with side or storm curtains, and arranged in the very finest manner possible.

Their 20-foot model (also designed by Whittelsy & Whitaker) is equipped with an 8-horsepower, double-cylinder, two-cycle Ferro reversible engine, arranged in practically the same manner as the 26-footer, but without the auto top.

They will also exhibit a 16-foot 1909 special launch, equipped with 3-horsepower Ferro engine, guaranteed speed 9 miles per hour, or 1¼ miles an hour for trolling, making it one of the finest fishing boats in the world. This is a trim, speedy little launch of perfect model, finely powered, with a reliable and efficient engine, equipped with silent under-water exhaust, with large air-tight compartments, insuring absolute safety.



Three-cylinder, two-cycle, 25-H. P. Ferro Engine with removable cylinder heads and offset crankshafts.

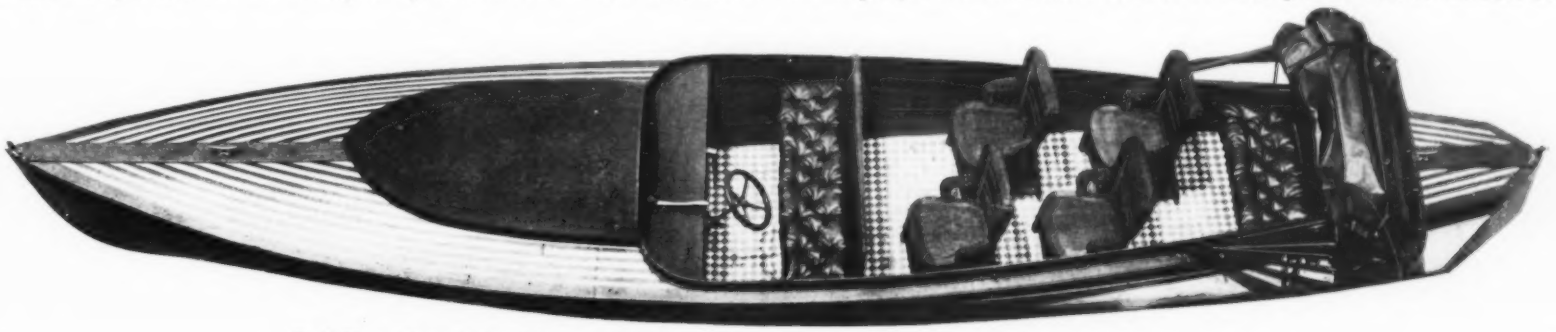
An Engine which is Accessible; a Running Gear which is Simple, Strong and Positive in Action

In spaces P and Q the Ferro Machine & Foundry Company, of Cleveland, Ohio, will show a line of their two-cycle engines of the crop of 1909. Among the most notable changes in the new Ferro motor is its offset crank shaft, which has been adopted by several of the best automobile motor manufacturers. This construction permits a slight deviation in the alignment of the cylinder center with the center of crank shaft, so as to give the connecting rod practically a vertical position on the downward, or impulse stroke. The merit of this feature lies in the transmission of energy from the piston directly down upon the crank shaft, reducing the side thrust of the piston upon the cylinder wall, and therefore reducing the friction and wear upon these parts. That greater power development is possible has been evidenced in exhaustive tests made with these new motors. Other improvements are the counterbalanced cranks, on both single and multiple-cylinder motors. This feature eases the bearings, and practically eliminates vibration. To withdraw the piston and connecting rod requires but the removal of the cylinder head and a threaded hand-hole plate in the crank case. Through this hole the crank-pin bearing is disengaged, and the piston and rod can then be removed through the top of the cylinder. But a moment's time is necsary to complete this operation, and the motor need not otherwise be disturbed.

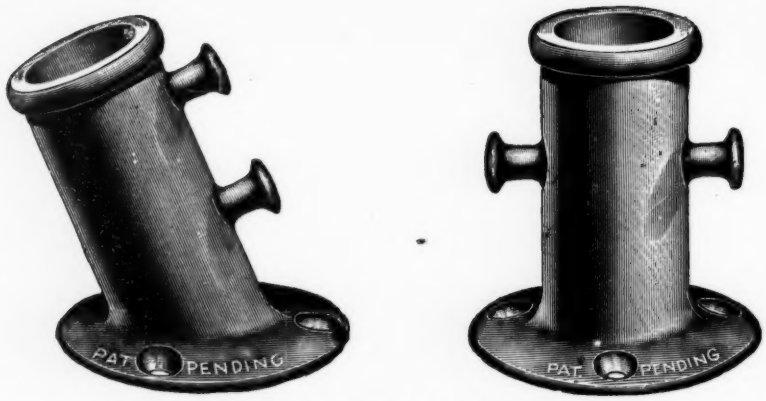
The bearings are so constructed as to be quickly replaced or adjusted. Bronze bushings form the bearings for the piston pin, and are easily replaceable with the removal of the piston from the cylinder. The methods of construction on the main bearings need hardly be explained, inasmuch as they remain the same as in their 1908 models. Briefly, they consist of babbitt metal, the lower half receiving the thrust being made in the crank base, with ample length and diameter to give an abundance of bearing surface. The upper half is a bronze cap, poured with babbitt and mounted upon several brass liners of standard thickness. The removal of one pair of liners allows the taking up of looseness on a main bearing as slight as two one-thousandths of an inch.

To those who desire the make-and-break ignition system, the Ferro Company are ready this season to supply it in connection with their single and double-cylinder engines. It consists of an extremely simple mechanism, with a lever to control late-and-early spark as well as to permit of reversing the motor. It may be attached to all one and two-cylinder Ferro motors, having the separate cylinder head construction.

The Ferro Company are now prepared to offer their customers a reverse clutch that will stand up to the full requirements of a marine motor without being a constant source of attention and worry to the operator. This clutch is of the same high quality and finish that has made it so successful in the past, and is constructed so as to be directly attachable to the base of



Deck View of the 26-foot Mullins Runabout, showing engine hood and arrangement of cockpit seating space.



A set of Durkee Flag-Pole Sockets with halyard bitts attached.

the motor, making it a rigid part of the engine frame and not allowing any lost motion between them. The adjustment to both forward and reverse brake bands are outside; easy of access, and a ball thrust bearing upon the after end of the clutch frame removes any pressure whatever from the working parts of the clutch.

The man who desires to place his motor well forward in the boat will find the Ferro rear-chain starting device a very handy piece of equipment, as it will permit of installation with any length of cranking shaft. All working parts of this device remain inactive after the motor is put into operation.

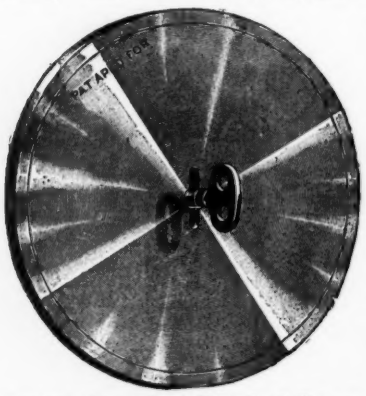
Hardware for Wet Places

C. D. Durkee & Co., of 2 and 3 South Street, New York City, have always been noted in previous years for their exhibition of up-to-date, practical boat fittings and supplies. At the 1909 show they bid fair to surpass all their previous records, and spaces Nos. 23, 24 and 25, to be occupied by them, will be one of the most popular portions of the show.

Among the many novelties and standard goods for which Durkee & Co. are noted, there will be exhibited a thief-proof gasolene protector in the shape of a lock deck plate, which insures one's supply of gasolene against the taking ways of the gentleman with a rubber hose and a bilge pump, whose calls after sundown, during the owner's absence, have, in seasons past, been responsible for a large number of skippers finding themselves confronted by a low tide in the fuel tank at most inopportune moments.

For those with more confidence in human nature, or whose moorings are in better protected localities, the Durkee keyless deck plate, which may be removed instantly or snapped in place without danger of stripped threads, will prove interesting. A new flagpole socket with halyard bitts attached to it will appeal, by reason of its simplicity and compactness, to the motor-boat owner.

There will also be shown a full line of marine lanterns, binnacles and compasses as well as several new styles of auto boat steerers and binnacle steerers combined with compasses, as well as a new style of planking clamp, which will strongly appeal to both professional and amateur boat builders. Besides these, pneumatic cushions, mattresses and spray hoods of various designs and qualities will complete the outfit of the old South Street house.



Durkee's Patent Deck Plate, Lock Pattern, to prevent stealing of naphtha.

For the Ordinary Pleasure Boat and Small Working Craft

The exhibit of the Bridgeport Motor Company will be located in section J, on the main floor, where a line of their various marine and stationary models is to be shown.

Bridgeport motors are of the medium weight, two-cycle type, and are furnished in either the two or three-port style. The single-cylinder model, series A, is furnished in 2½, 3½, 5½, 6½ and 8 horsepower. The two-cylinder type, series B, is furnished in 5, 7, 12, 14 and 16 horsepower. The series B model is composed of two cylinders, cast separately, of the split-base type, assembled on a one-piece bed plate, the manufacturer claiming that this method provides perfect alignment of crankshaft bearings, which, of course, is a vital point in the construction of motors having more than one cylinder.

Durkee's Patent Keyless Plate. Does not require key to open or close.

Their series C includes a 14 horsepower and 16-horsepower two-cylinder; 21-horsepower three-cylinder, and 28-horsepower four cylinder models. In these models the cylinders are also cast separately, are of the split-base type, and assembled on a one-piece bed plate. This bed plate is extended beyond the after cylinder to accommodate the reversing gear with which these models are regularly equipped. The reversing gear is of their own manufacture, built especially for the series C model, and shows simplicity, combined with great strength and durability.

The A and B models are not regularly supplied with reversing gear, this feature being optional, and any make of reversing gear is supplied that the customer may desire. The stock models in these series are supplied with make-and-break ignition of a design original with this company, which has many interesting features of merit, and which the manufacturer claims is largely responsible for the great reliability of the Bridgeport motor. This device is extremely simple, and the parts are very substantial. The springs used are of coiled bronze wire, making it impossible for them to rust and break. The time of ignition is advanced or retarded by a very ingenious device, having an eccentric movement; this adjustment may be accomplished by hand while the motor is in operation, without the aid of tools.

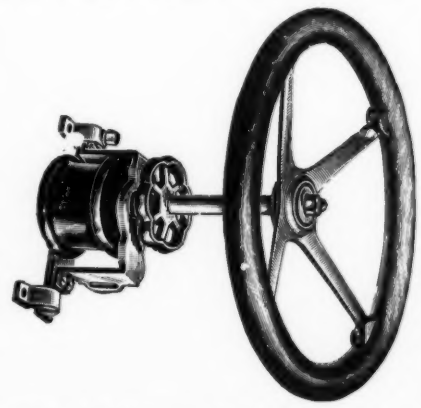
One of the Adjustable Auto-Pattern Boat Steerers which will be shown by Durkee & Co.

The spark plug is located in the cylinder head in a position at right angles to the rocker arm, or lower electrode, which, they claim, gives greater latitude of adjustment in taking up wear on the spark points than in placing the rocker arm and lower electrode parallel to each other, and therefore requires less frequent removal of same and renewal of points.

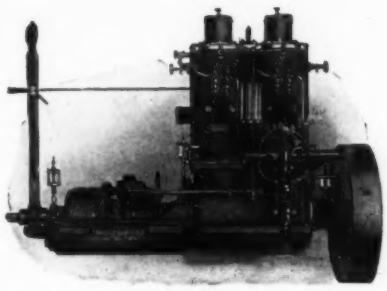
On all models the crankshaft bearings and the piston-pin bearings operate in removable bronze bushings, which are made from the best of bronze-bearing metal. The connecting rods are truss-shaped in design and made entirely of bronze. The lower bearing of the connecting rod consists of two bronze boxes, which are detachable, making the replacement of this bearing independent of the connecting rod proper. These boxes being separate, render adjustment easy and accurate.

The piston also shows special features of merit. The deflector is "S"-shaped, possessing more than ordinary height, and is so designed that the incoming charge is thrown directly to the top of explosion chamber, making the escape of the fresh gases through exhaust port practically impossible. The wrist pin is hung well toward the top of piston, in fact higher than ordinarily, which, with the extreme length of piston, obviates side thrust, and assists in providing an equal strain on the interior working parts, with a minimum of friction. Three piston rings are provided, which are eccentric turned, and the joints are lapped.

The construction in detail of Bridgeport motors is practically the same as last year. Notable among the recent changes is the placing of the rocker arm or lower electrode on a removable flange, per-



A Durkee Mahogany Steering Wheel for use with a tiller rope.



Two-cylinder, 10-H. P. Mietz & Weiss Engine, which allows a wide range in the use of fuel.

mitting of its being taken out for inspection without disturbing any other parts. They have succeeded in designing a removable flange, which necessitates no more metal between the lower electrode and the water jacket than formerly, making it possible for them to offer this feature as a decided improvement.

The single-cylinder models also show a water-jacketed exhaust connection, which has been added recently. The models having two or more cylinders are also provided with water-jacketed connection, the same as heretofore. All models are equipped with detachable cylinder heads, and each cylinder is provided with extra large detachable hand-hole plates. These latter features have always been supplied on Bridgeport motors and are one of the desirable features of their construction. The removal of these parts gives access to the interior of the motor, without the necessity of completely dissembling it.

The Bridgeport motor is built especially for the ordinary pleasure boat and small working craft. Its construction combines great strength and durability, making it a permanent working outfit.

Engines which have Proved Their Worth in Cruising Service

In space B, occupied by the Jencick Motor Manufacturing Company, of Port Chester, N. Y., one of the most attractive motors shown will be a special light weight engine of 7½-inch bore by 7½-inch stroke, to go into a 12-meter racing hull, Herreshoff model and build, for Mr. Richard Croker, Jr. This motor has developed 206 actual brake-horsepower under hydraulic dynamometer test of 1 hour and 58 minutes constant load. The total weight of the motor is 1,780 pounds, complete in every detail, with the exception of propeller and shaft. The steel in this motor, as well as in the others, is Krupp chrome nickel throughout. Minor bearings, such as cam shafts, magneto and pump shafts, and pump and crankshafts are mounted on Hess & Bright ball bearings. Reverse gear is also mounted on these bearings, and is constructed throughout of vanadium and Krupp steel. The load is picked up by friction and locked in positive position, which latter feature is patented by the Jencick Company. Ignition is by the Bosch low-tension magneto with magnetic make-and-break plugs, with a secondary ignition by a high-tension Connecticut coil distributor and Witherbee battery. Controls, levers, lubricators and all working parts are placed in such a position as to be in constant view of the operator. The carburetor is of G. & A. design, of French manufacture, allowing the motor to be throttled down below 100 revolutions, and when running idle to speed up to 1,475 revolutions. The steadiness of this motor when running, due to balancing and perfect workmanship, is such that when an octagon pencil is placed crosswise on the waterpipe it will remain in that position, though the motor is turning up 800 revolutions. Or, in a more practical way, the motor may be compared with an electric motor in action, and can be run at from 700 to 800 revolutions without being bolted down to the testing blocks.

Other motors, similar in design and construction, which will be shown, include a six-cylinder, 5 inches by 5½ inches, rated at 60 horsepower, and which has shown 75 horsepower at 1,000 revolutions; a six-cylinder, 4½ inches by 4½ inches, called 30 horsepower by the Jencick Company, but which has developed in the neighborhood of 50 horsepower at 1,000 revolutions.

In a four-cylinder, 7½-inch by 7½-inch motor, arranged similarly to the Croker six-cylinder motor, the lubrication is triple. The cylinders and piston pins are oiled by a Pederson mechanical force-feed lubricator, feeding to both sides of the cylinders—to the base by a splash and force system, in which the oil level is maintained constantly, regardless of the position in which the motor is set.

This four-cylinder motor is rated at 50 horsepower for 500 revolutions, and is an ideal power for cruising boats of from 17 to 21 tons. Ignition is by Bosch magneto, with the Jencick make-and-break system, and reverse gear is of their own design.

Kerosene, Crude Oils or Alcohol Serve as Fuel for this Engine

Space V will be devoted to a line of engines operated on common kerosene, crude oils or alcohol, and without electrical devices for ignition, carburetors or vaporizers. These engines are manufactured by the August Mietz Iron Foundry & Machine Works, New York City, and are noted for their simplicity, reliability and economy of maintenance.

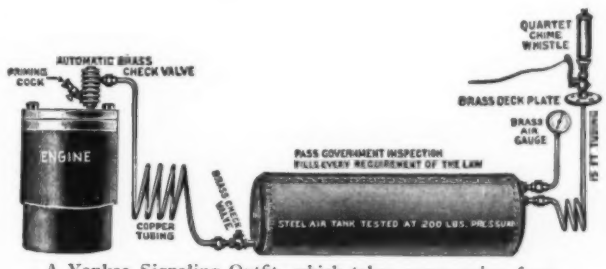
Yankee Muffler, which silences the exhaust.

They are built in sizes ranging from 2 to 200 horsepower, and as samples of the line there will be shown a 3½-horsepower, single-cylinder; a 10-horsepower, two-cylinder; a 22-horsepower, three-cylinder of the marine type, and a 6-horsepower, single-cylinder, horizontal stationary engine.

In addition there will also be shown a Mietz & Weiss reversing friction clutch, which will prove of much interest to the boating fraternity.

Securing Silence at the Exhaust and Producing a Noise at the Whistle

Two diametrically opposed desires are, oddly enough, what the average motor boat enthusiast aims at accomplishing when assembling his power equipment; viz.: the reduction to as close an approximation to absolute silence as possible in the disposal of the exhaust gases from the cylinder, and as great a clamor as may be obtained from his signal whistle.



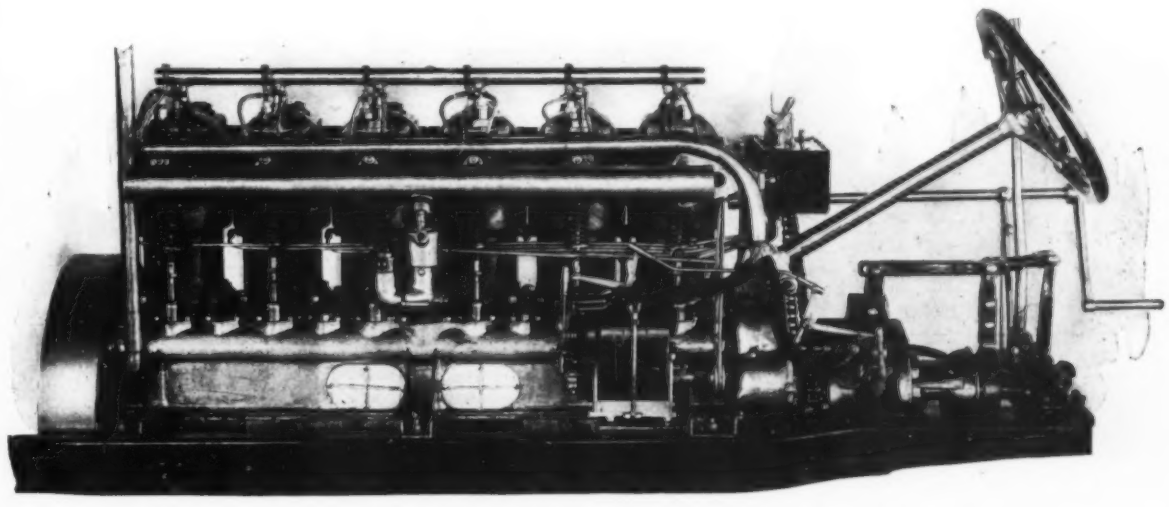
A Yankee Signaling Outfit, which takes compression from engine cylinder.

The Yankee Company, of Utica, N. Y., have taken upon themselves the gratification of both these desires on the part of the motor-boat owner, and as a result have evolved the Yankee silent mufflers and the Yankee whistle outfits. The former of these will, they claim, so reduce the noise of the exhaust as to render it scarcely noticeable at the distance of a few feet, while at same time it takes no power away from the engine; and with their whistle outfit they utilize a small percentage of the explosive charge of the cylinder to store in the whistle tank enough compressed burnt gas to awaken the echoes when the whistle cord is pulled.

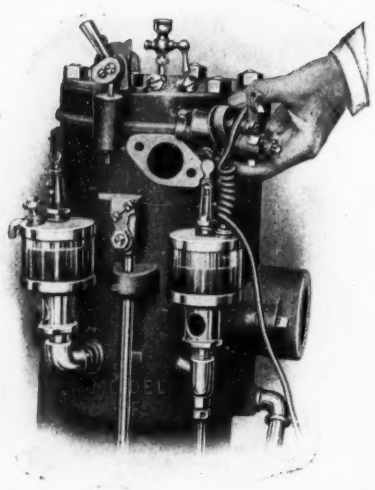
Just how these results are obtained will be fully demonstrated to a large and admiring audience in space No. 15.

A Pleasing Line of Two and Four-Cycle Engines

Space C will be occupied by the Bruns Motor Exchange, of 327 Central Avenue, Jersey City, N. J., who show a full line of the Essex two-cycle and the Campbell four-cycle motors. The exhibit of Essex engines will consist of the light-weight, high-speed, jump-spark Essex special, as well as the slow-speed, make-and-break heavy Essex standard type. These engines are built from 2 to 45 horsepower, and are inter-



Six-cylinder, four-cycle, 5 x 5½, 70-H. P. Jencick Motor, for Runabouts and High-Speed Boats.



A Royal Engine, with make-and-break ignition. View shows the accessibility of the sparking points.

changeable from make-and-break to jump spark, and also from two to three port. They have been giving first-class service for several years past, and are distributed along the entire Atlantic Coast.

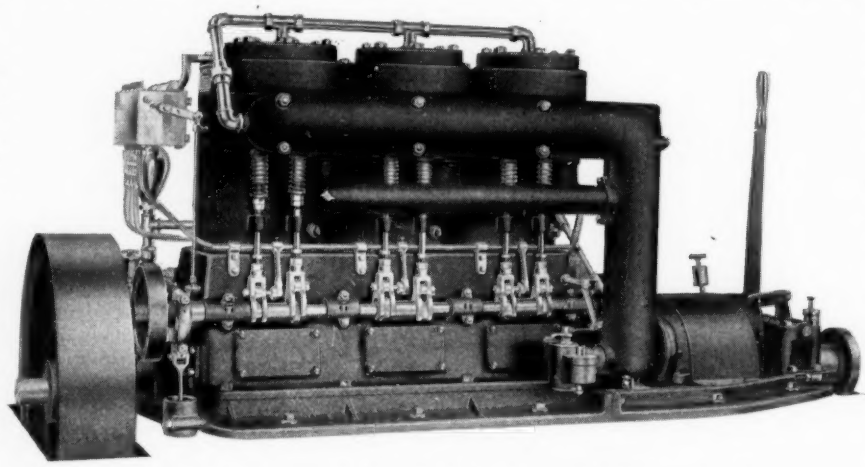
The Campbell engines are built in horsepowers ranging from 5 to 60, and with from one to six cylinders, and are of the four-cycle type, either make-and-break or jump spark. They are of the open-base type, and have aluminum side plates fastened with thumb screws to prevent splashing of oil. They are medium weight, medium-speed motors, built especially for cruising boats, where long, continuous and smooth running is required, and are equipped with mechanical oilers, which operate automatically when the engine is started and cease when motor is stopped. The open-base construction allows the removal of piston from cylinder through the bottom without interfering with any other part of the engine. The crankshaft can also be removed without taking the engine from its bed or taking off any other part. The exhaust valves are so constructed that they can be taken off without touching any other part of the engine, and can be reground very readily when they are in their working position. The engines are equipped with either rotary or plunger pumps, and in the larger sizes with whistle pumps for compressed air. The engine is one of the neatest appearing on the market.

How a Prospective Purchaser May Obtain "Inside" Information An enterprising move of the Royal Equipment Company, of Bridgeport, Conn., at the show will take the form of exhibiting in space A one of their 5-horsepower, single-cylinder engines in "knockdown" condition, so that the interested observer will have an opportunity of ascertaining, at first hand, the construction, size, location and finish of the various component parts of a Royal engine.

This speaks pretty well for the care lavished upon the engine by its manufacturers, for only mechanism of a high degree of perfection could stand an intimate inspection such as this.

In addition to this sectional view, the Royal Equipment Company will show a 2½-horsepower, a 5-horsepower and a 7-horsepower, single cylinder, as well as a 5 and a 10-horsepower motor in the double-cylinder type.

Exceptional Fuel Economy is Claimed for this Engine The Ralaco four-cycle marine engine, the product of the S. M. Jones Company, of Toledo, Ohio, will, in space A, attract the attention of visitors. The Ralaco utilizes the mechanically-operated admission valves, whose mechanism is so simplified as to contain as few parts as a valve actuated by suction. Cam shaft, driving gear, bearings and lower rocker levers are all housed, the only exposed parts of the valve gear being the push rods and upper rocker levers. As valves are arranged vertically and directly over pistons, overhanging valve boxes have been eliminated. The valves are set in cages, and may be instantly removed for inspection. Passages in the upper part of the housing have taken the place of separate inlet exhaust and water-manifold piping; and the absence of piping to the cylinders allows their ready removal when desired. The air supply is warmed by the exhaust, and the degree of warmth of this air supply may be regulated by the simple expedient of increasing or decreasing the amount of water entering the exhaust passage. Lubrication is supplied by a very ingenious splash system, and all sizes above the 15-horsepower are provided with a governor, to prevent racing when the load is thrown off. This governor is connected with a balanced throttle valve placed between carburetor and cylinders.



36-H. P., three-cylinder Wolverine Engine, which may be operated with gasolene, kerosene or distillate as fuel.

The Ralaco engines are built in 10-horsepower, two-cylinder, developing their horsepower at 600 revolutions per minute; in 15-horsepower, two-cylinder, at 500 revolutions per minute; in 20-horsepower, four-cylinder, at 600 revolutions per minute; 25-horsepower, two-cylinder, at 375 revolutions per minute; in 30-horsepower, four-cylinder, at 500 revolutions per minute, and in a four-cylinder, developing 50-horsepower, at 375 revolutions per minute.

Improvements in Detail and Refinement in Finish It is a somewhat difficult task to mention specifically the improvements in the '09 type of Stanley motors manufactured by the Stanley Company, of Boston, Mass., over those of last year. The improvements lie along the line of a general refining of the minor parts and accessories, giving to each a longer wear and insuring smoother running.

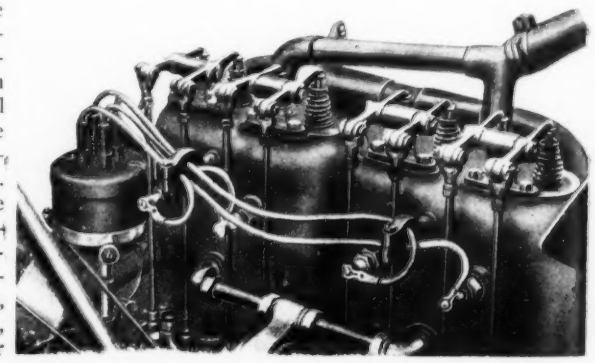
These engines will be exhibited in space C, and will undoubtedly attract as much favorable comment as at the Boston show, in the account of which, in January YACHTING, a detailed description of these engines appeared.

An Economical Engine which Runs on Almost Any Kind of Fuel The heavy-duty, slow-speed engine has, during the last few years, received considerable attention at the hands of the most skillful mechanical geniuses of this country. This is on account of the fact that it is an absolutely necessary type for the proper powering of heavy-bodied, generous-beam cruising hulls, and for almost the entire range of marine commercial work.

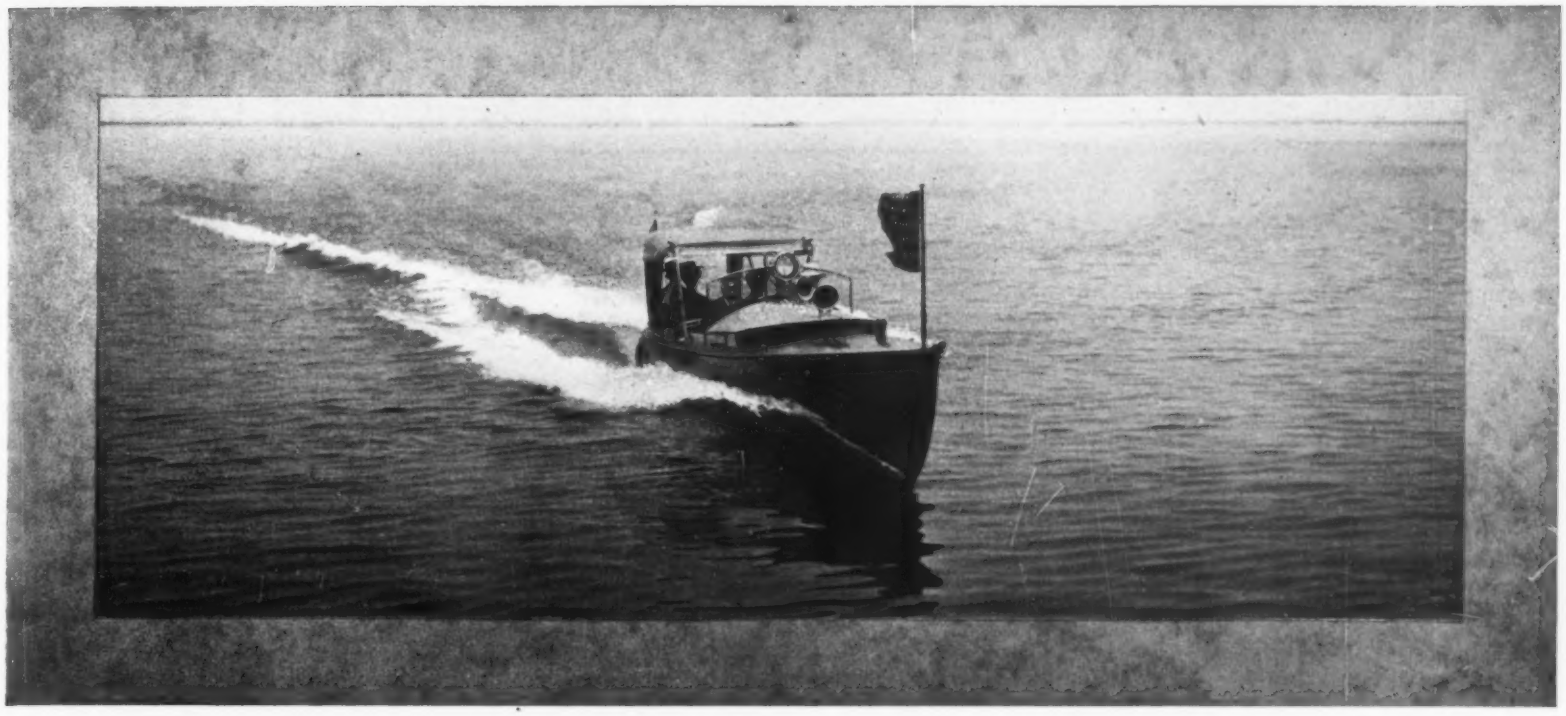
The Wolverine Motor Works, of Bridgeport, Conn., point with pride to the fact that they are one of the oldest concerns who have devoted their exclusive attention to this type of gasolene motor, and the results of their years of experimenting will be presented in space L-102. The exhibit will consist of one 5-horsepower, single-cylinder engine, one 18-horsepower, three-cylinder engine, one 36-horsepower and one 50-horsepower, three-cylinder engine, with propeller wheels and other engine accessories, such as are regularly used in connection with their make of engines.

These engines will all be of the four-cycle type, fitted for the use of kerosene, gasolene or distillate as fuel, and are all for marine purposes. The inside bearings of these engines, that is, the pistons, connecting-rod boxes and crankshaft bearings, are lubricated by a sight-feed system, which is operated from the same eccentric that operates both circulating water pump and whistle air pump. All of the moving parts of the engine, such as the cam shaft, which operates the inlet and exhaust valves, igniter shaft, etc., are on the outside of the engine. The starboard side of the base is fitted with three hand-hole plates, or doors, which are hinged at the bottom and held shut by a latch lever, which is shown at the top of each of these plates. These give access to the interior of the base if it becomes necessary to make adjustments on connecting-rod boxes or crank shaft bearings. The reverse clutch is of the spur-gear type, with cut-steel gears, controlled by one lever, for the go-ahead and back-up motion of the propeller wheels, as well as for neutral.

The speed control is through the lever, which is shown at the starboard side of the after cylinder. This lever controls the point at which ignition takes place on all three cylinders at the same time. There is also a connection from this lever through the base of the engine to the carburetor, which controls the fuel supply as the spark is advanced or retarded. All parts of the engine are thoroughly water-jacketed, including cylinders, cylinder heads, valve chamber and caps, and exhaust pipe.



American Igniter—a combination of coil, distributer and timer attached to engine.



35-foot Elco Express, a luxuriously-appointed runabout, whose six-cylinder Peerless Auto-Marine Engine is guaranteed to give a speed of 23 miles.

A Compact Ignition Outfit The American Electric Fuse Company, of Muskegon, Mich., will occupy space No. 36, wherein they will show their American igniter, which attracted so much attention at the Boston show, and was described in our January issue. The igniter will be mounted on vertical revolving spindles, so that both the principle and the performance may be observed and understood. The sparks will be shown passing across spark gaps, and a set of plugs, mounted in a rack, will make investigation easy.

A Demonstration of Service Actually Rendered That a marine engine, when properly used and given sufficient attention, is in really better running order after a period of service is a fact known to motor boat users. Of course, it has to be the right kind of an engine to commence with, and the owner must give it the same amount of attention that he would bestow on any other bit of mechanism of an equal cash value.

The Holmes Motor Company, West Mystic, Conn., will prove this proposition regarding Holmes motors in particular, by showing in space B, east end, a 25-horsepower, four-cylinder, four-cycle Holmes motor that after nine months' service during the last year is in better shape than a new machine. In addition to this their exhibit will comprise a 38-horsepower, five-cylinder, and a 60-horsepower, four-cylinder engine. The 60-horsepower machine will be of the same size and type as the ones furnished for boats recently built for Messrs. Latham A. Fish and J. H. Hanan, of the New York Yacht Club—craft of 47 and 50 feet, respectively, that make from 18 to 18½ miles per hour.

This engine, it will be observed, has off-set cylinders, so that the greatest angularity of thrust on the working stroke is only about 8 degrees. The cylinders have a diameter of 6 inches, and the stroke of 8½ inches allows of greater flexibility and smoothness in running.

Luxurious Speed Runabouts and Day Cruisers—A New Engine and Improvements in Electric Boats The Elco Works, of Bayonne, N. J., will exhibit at this show four high-speed motor boats which are representative of the company's standard of construction.

The largest of these boats will be a 48-foot gasolene cabin launch, known as the Elco-De-Luxe, intended for lake and harbor use. The hull is light, but substantial, and the cabin work throughout will be in African mahogany. The motive power will consist of a 60-horsepower, air-starting Standard gasolene motor. The operator's seat is immediately aft of the motor, and separated from owner's quarters by a bulkhead and large glass window-shield, which drops into pocket when not in use. A distinctive feature is the large owner's cockpit forward, which permits an unobstructed view ahead. Seating accommodations are furnished by chairs and divans.

The main cabin is enclosed by large balanced plate-glass windows of unusual width. The woodwork is very elaborate, being paneled in selected mahogany. The furnishings consist of upholstered divan seats with spring cushions and backs; wicker chairs; serving table; buffet and china cabinet. The upholstery is exquisite, the cushions being covered in finest of red silk velour, the floor coverings being heavy Wilton carpet. Window curtains and portieres are of green silk. The boat throughout is lighted and heated by electricity, the dynamo being driven by the main engine with storage auxiliary power. A unique type of electric fixtures are used throughout the boat; electricity is also used for cooking.

Aft of main cabin is situated the galley with copper basins and brass water pump,—fresh water being carried in a 50-gallon water tank, filled from deck,—dish racks and cupboards with large zinc-lined ice-box. The galley equipment consists of electric stove and tea kettle, particularly useful in a boat of this size, for serving hot lunches and afternoon tea. Opposite the galley is a fully equipped lavatory. A mirror with glass holders and racks for brush and comb are also provided in this compartment.

A pair of Elco Electric Launches. All machinery is concealed, only the simple steering and controlling devices being exposed.

Elco-de-Luxe, a recently-developed type of high-speed cabin launch, with double cockpits, designed especially for use on lakes and harbors.

A special feature of this boat is the cockpit aft of the main cabin, covered with a canvas fly awning, supported upon brass stanchions, room being provided in this cockpit for half a dozen wicker chairs and a luxurious rear or divan seat, upholstered in leather. An unusual amount of cabin accommodations are provided for a boat of this length, and when it is further considered that with the power installed the builders guarantee a speed of 18 miles per hour, it will be seen that the 1909 Elco-De-Luxe is a most unusual boat. The Elco Works have built several boats of this general type, which have proved very successful in the hands of their customers. One is owned by Mrs. Clark Fisher, of Trenton, N. J., who uses her high-speed Elco motor boat on Lake Como, Italy. Another feature of the design of this boat is the location of the gasolene engine well forward of amidships, where the room cannot be so well utilized for seating and cabin accommodations. With the engine located forward, 75 per cent. of the boat is had for the owner's quarters, which are entirely distinct and separated from the engine compartment. The service for which this boat is intended is that of a day cruiser or an express launch, with full cabin protection for use in going from water or summer residences to railroad or steamboat landings, a high-speed service being possible at all times with this type of boat.

Two new models of Elco-Peerless gasolene express launches will be shown, one 30 feet and the other 35 feet in length. The past season's success in this class of motor boat has led the company to adapt the Peerless auto-marine gasolene engine in four and six cylinder sizes. However, where the customer has any particular choice, any reputable make will be installed instead. The 30-foot boat will be finished with white cedar hull, decks and cockpit being of mahogany. The 30-horsepower Peerless auto-marine gasolene motor will be installed under a metal hood forward, with controls mounted alongside of auto-steering wheel. The cockpit will be arranged with cross-seat for operator, four wicker chairs and a comfortable upholstered divan seat aft.

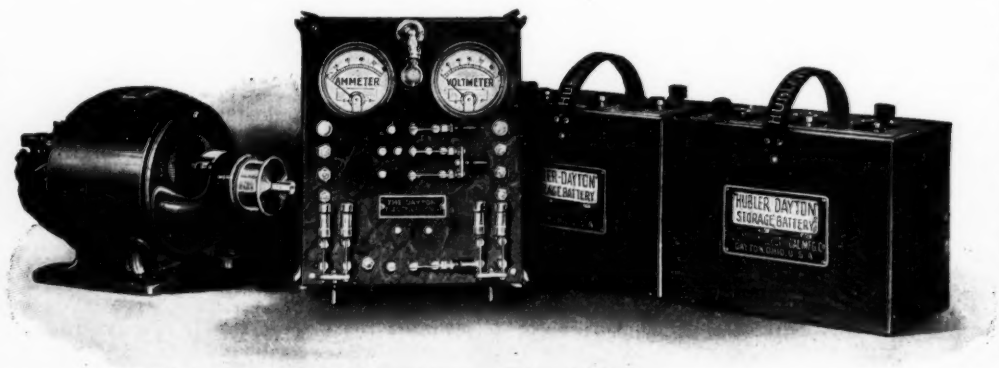
The 35-foot Elco-Peerless is similar, in many respects, to the stock model which made such a good showing in the New York to Poughkeepsie race on the Hudson last fall. This type of boat meets the requirements of high speed with absolute safety under varying conditions of service. Every effort has been made to obtain smart and luxurious appointments for the owner's comfort. The cockpit will be covered by a special extending cape cart top with glass windshield forward. The hull is of select Honduras mahogany, and the decks and cockpits are finished in the same material. The coaming, sheerstrake and covering board are of select quartered oak, which makes a pleasing contrast with the mahogany, and adds materially to the strength of the hull. The six-cylinder Peerless gasolene engine will be installed under a specially designed holding hood, with all motor controls on steering wheel. The feature of double ignition, distinct in every detail, will again be carried out. The cockpit will be arranged for nine passengers, with wicker chairs and divan seats for their accommodation. The speed guaranteed with the four-cylinder Peerless auto-marine gasolene engine in a 30-foot boat is 20 miles per hour, while 23 miles per hour will be guaranteed in the 35-foot Elco-Peerless high-speed motor boat. The service to be had from these boats will correspond to that of the automobile on land.

The Elco Works will also exhibit one of the latest models of their well-known electric launches, 25 feet in length, the electrical apparatus being equipped with their latest improvements. A new type of battery will be shown with this boat, increasing the mileage capacity considerably over what has been obtained in the past on one full charge, the boat being able to travel 90 miles, which is nearly double the mileage heretofore obtained in a boat of this size. Auxiliary control switch will be installed, permitting the control of the power at two distinct points in the boat. The company will also exhibit a very compact electric direct-connected charging outfit, permitting the use of the boat in any locality. The charging plant will be automatic in operation, no skilled attention whatsoever being required, and it can be easily set up in a boat house or on a dock. The electricity generated by the plant can be used for house lighting if desired. This electric boat will be handsomely equipped with Wilton carpets and wicker chairs. The luxurious divan seat and back will be upholstered in green silk. The after deck, a feature of all electric boats, will be covered with handsomely upholstered cushions of the same material as the divan seat. This part of the boat is most popular with all owners of electric launches, as it permits one to lounge at full length.

Many of the most prominent people of the country are users of the Elco electric launches, and the company continues making improvements in these boats and bringing them up each year to a higher state of perfection. As an illustration of the other uses of electric boats, the company has met the requirements for commercial service in their passenger type of launch, which is very generally used at all the well-known parks and pleasure resorts throughout the country, among them being Central Park, New York City; Prospect Park, Brooklyn, and the New York Zoological Park. A large number of Elco electric launches are daily in use carrying thousands of passengers, and there never has been an accident whereby a passenger was hurt, which is a most unusual record, and illustrates forcibly the many advantages gained in this type of boat, among which may be mentioned the absence of danger from fire or explosion, ease of operation, freedom from noise, heat and vibration, and reliability. The largest boats are usually operated by one person, generally the owner, and often by a lady.

Electric Lighting and Ignition Outfits for the Boat Owner

In their space the Dayton Electrical Manufacturing Company, of Dayton, Ohio, will exhibit three extremely interesting electric plants, whose compactness and power will commend them to the owner of high-grade craft. One outfit consists of a 6-volt equipment for furnishing current to three incandescent lights for a small launch. Another is a 12-volt proposition, running 8, 12-volt, 12-candle-power incandescent lights; while a third—and the largest of the collection—is also a 12-volt outfit, but having the capacity to run 15, 12-volt, 12-candle-power lights. The two larger outfits provide power for running a good size search light.



A 12-volt Dayton Electric Lighting Outfit, which furnishes current for eight 12-candle-power incandescent lights and searchlight.

Each of the three outfits consists of a dyanmo, storage battery and switchboard. The plan of wiring provides for taking the igniting and lighting current from the storage battery at all times, while

the dynamo is used to keep the battery recharged. The switchboards are provided with meters and switches, so that they take care of all connections between the dynamo and the battery, and by means of their meters they give the operator knowledge of what the system is doing, enabling him to properly operate the plant.

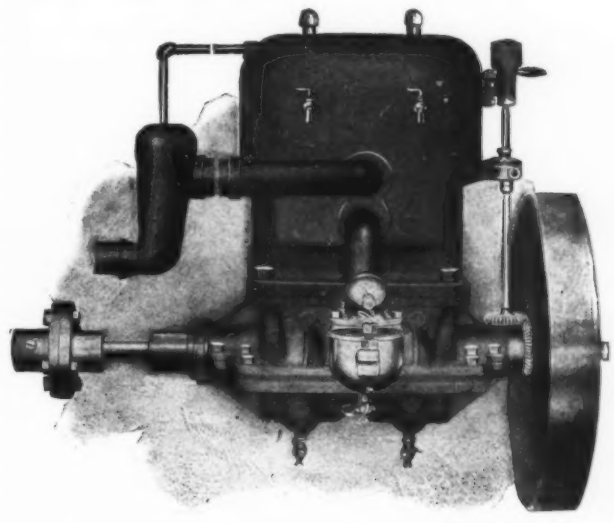
The outfits have been so designed as to construction, weight, size, etc., that they are perfectly adapted to marine use and may be easily installed on any machine, regardless of the size of the engine's fly-wheel, or the speed at which it turns.

Electric lighting outfits have proved their practicability for motor-boat use, being clean, convenient, brilliant, odorless, smokeless, healthful, dependable, inexpensive, inextinguishable, ready for use at the turn of the button, and absolutely safe near a gasolene tank.

The outfits, described above, provide current for operating an exploring lamp, electric cigar lighter, siren or horn, annunciator, whistle, etc.

A Boat and Engine Exhibit with Plenty of Vim Therein

The record-making and prize-winning racers Vim and Den will grace the space of the American & British Manufacturing Company, of Bridgeport, Conn., which they have obtained at this show. Besides these famous craft two 20-horsepower and two 40-horsepower marine engines will also be shown to an admiring public. The 20-horsepower engine is of the four-cylinder, four-cycle en bloc type, the crankshaft being mounted on two ball bearings. Both cam shaft and idler gear are also ball bearing. The dimensions of this engine are 3¾ by 4 inches. The crank case is of the one-piece type, with inspection doors for convenience in adjusting bearings. The 40-horsepower is an auto-marine engine of the same type that the American & British Company have been selling the Chalmers-Detroit Motor Company for the past two years, and which has been converted into a marine proposition. The cylinder dimensions are 5 by 4¾ inches, and the main bearings are die cast, deoxidized babbitt, which has shown wonderful results in service. The crank case is of the one-piece type, with inspection doors. The oiling system is of the constant-level splash type. Included in this outfit is a multiple-disc clutch starting and steering mechanisms, the latter being arranged like that of an automobile, with throttle and spark control on the wheel post, so that one man can operate the engine and steer.



Two-cylinder, 12-H. P. Lackawanna Engine, with new Schebler carburetor, Hall-Lackawanna high-efficiency throttle and Hydrex exhaust silencer.

The six-cylinder engine to be shown is a new type recently produced, and has the same bore and stroke as the "40." This engine is rated at 60 horsepower, but its maker claims that it will easily develop 75 at 1,200 revolutions per minute, and it is equipped with a clutch and steering and starting mechanism, all of which are much more powerful than those on the "40."

The 80-horsepower, which will be placed in the Den, is a four-cylinder, four-cycle engine, and is 6⅞ by 5¾ inches, with one-piece crank case, having inspection doors. The oiling system consists of a forced feed on the journals, with splash lubrication in the crank case. The starting mechanism is a chain-cranking device, geared 3 to 1. The steering mechanism is arranged as in the "40" above described. This engine will easily develop 100 horsepower at 1,200 revolutions per minute. Simplicity of design, light weight and flexibility are the points of superiority claimed for this engine.

A Good Showing of Reversing Gears

The Snow & Petrelli Manufacturing Company, of New Haven, Conn., manufacturers of Joe's improved marine reversing gear, will exhibit a full line, consisting of five or six sizes of this gear, ranging from the smallest power up to 150 horsepower at 1,000 revolutions per minute; and three sizes of one-way clutches. Their reversing gear is made with a powerful eccentric on the engine end, which transmits motion to the reversing gears—three in number—and is constructed of hardened cut steel spur gears. The small numbers of these gears required, and the fact that none of them runs faster than engine speed, render them quiet and smooth in operation.

As an example of the operation of the reverse mechanism, they will exhibit a skeleton-covered machine operated by electricity, so arranged as to allow a thorough observation of all running parts.

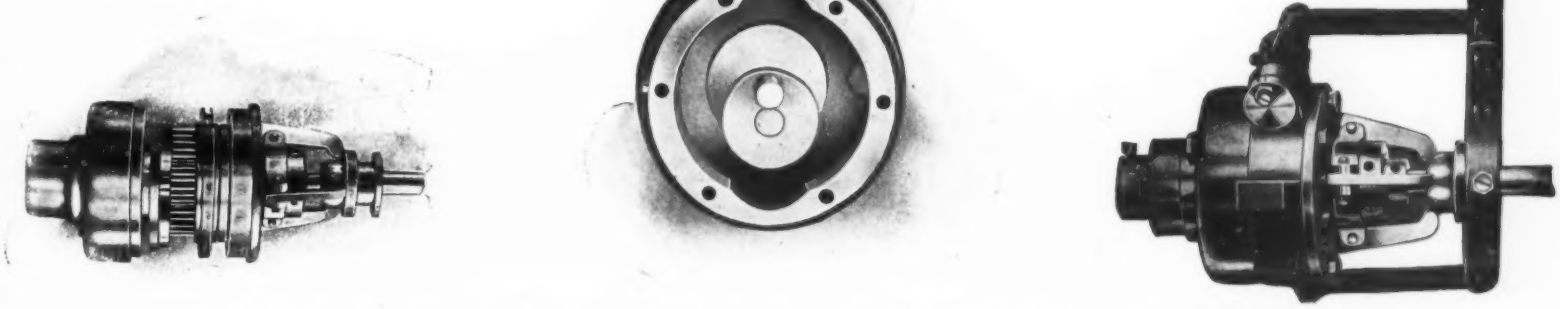
Valveless Motors of Simplicity and Accessibility

Space near the United States Government life boat will be occupied by the Lackawanna Manufacturing Company, of Newburgh, N. Y., who will exhibit through their Liberty Street, New York, office, a highly developed, new valveless motor.

While this company claims seniority in the making of three-port engines, they have not been obliged to change their original scheme of construction. Designed from the first with all moving parts adopted from the latest and best principles of steam-engine design, it has never been necessary to change these details. With these mechanical parts correct from the start in the Lackawanna, every effort has been exerted to perfect the parts, clearances and gas spaces until such reliability and perfection has been effected that an ordinary Lackawanna marine engine may be taken from stock and coupled to run the most sensitive generator for wireless telegraph.

The new Schebler carburetor, with new Hall-Lackawanna high-efficiency throttle, provides a wonderful range of speed and economy. It is claimed that the Lackawanna is one of the simplest of the high-grade marine engines. Among the improvements to the Lackawanna reversible engines for 1909 is the convenient new reverse lever on the side, projecting above the top of cylinder so as to be reached from any side—forward, aft or athwartships. It has always been a feature of the Lackawanna valveless that they are reversible. Instead of a contact button on the timer, the secret rests in the peculiar automatic method of cutting in or out the spark. This is effected, automatically and instantaneously, simply by moving the lever to extreme forward and aft positions, as against the old and confusing way of moving lever athwartships. The new "guillotine" type of throttle is operated by a control lever, with handle 2 inches shorter, but side by side with the reverse lever.

A full line of engines will be shown, comprising the single-cylinder 2½ and 4½-horsepower sizes; the double cylinders in 5, 9, 12 and 15 horsepower; the triple in 22 horsepower, and the four-cylinder in 27 horsepower, and 30 to 35-horsepower sizes, together with a working, sectional and direct-connected, electric-light engine for motor or sail yachts. Long,



Interior and exterior side views, also sectional end view of Joe's Reverse Gear, no portion of which runs at greater than engine speed.

positive sweep of piston gives ample time to get maximum energy from each explosion. The moderate speed makes for steady running and long life.

By an improved construction, cylinders can be removed without disturbing the crankshaft, timer, pump or foundation; at the same time giving access to all bearings without needlessly disturbing other parts in taking up wear by adjustment. Thrust, pistons, connecting rods and piston pins can be removed without disturbing foundation. A very substantial base, with plain, clean surfaces makes the Lackawanna an easy engine to install and run.

The Lackawanna Company are showing all engines as fitted with their ingenious new ignition apparatus developed from that supplied so successfully for the last three years to Gloucester and Cape Cod fishermen. It improves and adds to the general Lackawanna appearance of simplicity in the electric connections. Correct equipment and fittings are shown, comprising Hydrex silencers, sub-surface outlets and piping outfits for exhaust, bronze removable screen scoop strainer, tanks, copper pipe and valves for gasolene pipe, and fittings for water, together with solid Harthan pattern propeller, reverse propeller, reverse gear and gearless-clutch equipments, all of new improved designs, to be shipped complete with engines as desired. Perhaps the greatest individual improvement this year is the patent pipeless pump and timer element of the Lackawanna. A separately machined and assembled frame supports pump, timer, timer-driven gear and gear cover, all self-contained and complete, as well as interchangeable. This leaves the several important parts each complete in itself and independent of other parts.

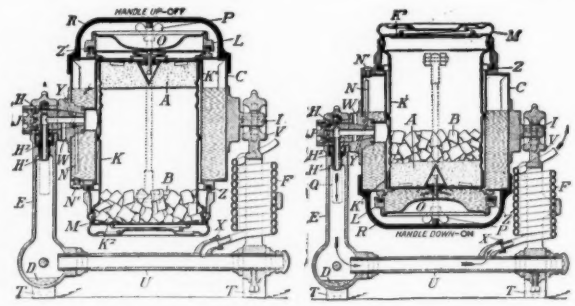
Pilot-House Searchlight.

A New Acetylene Lighting System

The Rose Manufacturing Company, of Philadelphia, manufacturers of motor-boat search lights, will have on view at the show their new patent gas generator, the operating principle of which is based on reversing the generator. This act of inversion breaks the contact between the wet carbide and the moist ashes, and immediately discontinues generation of the gas. Reinverting the apparatus causes an instantaneous generation of gas, and does away with loss of time in waiting for the gas to be produced.

This generator is marketed under the well-known trade mark "Neverout," and is very useful for lighting the interior of cabins of motor boats, as well as furnishing light to the searchlight, side lights, etc. The double-cylinder generator, shown below, is sufficient to take care of a number of lights.

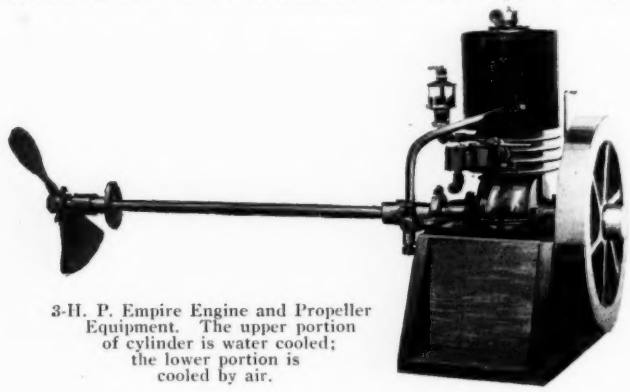
The Neverout system of lighting boats is the most economical extant, costing less than one-twentieth the price of the ordinary electrical outfit. The Rose Manufacturing Company, of 935 Arch Street, will be pleased to furnish information for the benefit of prospective users of a safe and efficient lighting system on request. The company will also show their new and powerful searchlights, which are the most powerful acetylene searchlights made at the present time. They are useful in picking up buoys, making night landings, adjusting rigging, etc., and on account of their intense power always insure a feeling of safety during the darkest nights.



Sectional Views of Single-Cylinder Producer, showing it in the "on" and "off" positions.

A Combination Water and Air-Cooling System

In space B, the Empire engine, manufactured by the Empire Cream Separator Company, of Bloomfield, N. J., will be on view. This engine is made in two sizes only: 1½ and 3 horsepower. Simplicity and compactness are features of its construction. Grease cups are absent, the lubrication being furnished from a single oil cup. A peculiar feature of the construction is the combination of water and air-cooling systems. The upper part of the cylinder is water-jacketed, and the lower portion has radiating flanges on which is kept playing a continuous current of air from the fan-shaped spokes on the fly-wheel. Jump spark ignition is used with the new Empire double-contact timer. An engine of 1½ and one of 3 horsepower of the marine, and the same powers in the stationary type will be shown, together with the various parts of a marine engine, allowing the design and workmanship to be inspected.



3-H. P. Empire Engine and Propeller Equipment. The upper portion of cylinder is water cooled; the lower portion is cooled by air.

A Lighting Outfit that will Attract Much Attention

The Richardson Engineering Company, of Hartford, Conn., will exhibit in their space the same line of electric lighting outfits and the electrically-operated ship's telegraph exhibited by them at the Boston show, a complete description of which appeared in the January issue of YACHTING.

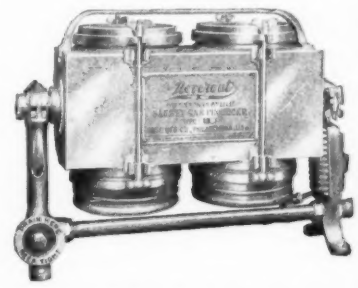
Enlargement of and Improvements in a Well-Known Make of Engine

The Buffalo Gasolene Motor Company, manufacturers of the celebrated "Buffalo" marine engines, will have a very comprehensive and attractive exhibit.

In addition to the various sizes of their regular and heavy-duty types, they will exhibit a new model high-speed machine, which represents a most up-to-date and high grade piece of marine engine construction. In getting out this new machine, the Buffalo people have adhered to all the good principles and features of their former models, and also included a number of new and distinct improvements and ideas. These machines are built in four and six-cylinder, 50 and 75-horsepower, 6¼ by 6¾—the last mentioned size having been exhibited at Boston. They are a very compact machine, with low center of gravity—an important consideration for a speed boat. They are fitted with all modern improvements, such as force-feed lubricators, double system of ignition, *i. e.*, Bosch magneto direct connected and timed with engine, regular coil and battery system, a positive locking clutch in connection with regular friction clutch, rocker arm construction for valve lifters, and many other minor features.

In addition to this machine, this company will exhibit in their regular medium-weight medium-speed machines, a 3-horsepower two-cylinder, a 10-horsepower four-cylinder, 20-horsepower four-cylinder, and in their high-powered machines, a 65-horsepower four-cylinder motor, this machine differing in construction from any of their other models. In their slow-speed heavy duty type, they will show a new size 4-horsepower single-cylinder, which has recently been placed on the market and which is very popular for auxiliary work; and for a heavy-class of boats where a small powered reliable engine is required, a 12-horsepower 2-cylinder and a 36-horsepower four-cylinder will be exhibited.

The improvements on both the medium speed and the heavy-duty engines for 1909, include the following: Force-feed lubricators, gear-driven; water-jacketed exhaust manifolds; rocker arm construction for valve lifters; improved type of reverse gear, giving a much stronger and, at the same time, a much simpler clutch; and, last but not least, a double system of ignition, consisting of Bosch magneto, direct connected and timed with the engine, in addition to the regular coil and battery system. These improvements will be standard equipment on "Buffalo" engines—10 horsepower and over—henceforth. Force-feed lubricators, Bosch magnetos and water-jacketed manifolds are not supplied to engines smaller than 10 horsepower as standard equipment.



Double-Cylinder Producer for generating acetylene gas for search lights and cabin interiors.

They will also have other articles and fittings in connection with their business on exhibit, among which may be mentioned a new device which makes possible the use of kerosene as fuel for "Buffalo" engines. This device has been thoroughly tried out and works to perfection, and when fitted to a "Buffalo" the cylinders and valves do not become fouled up rapidly, as perfect combustion is secured.

For the Man who Desires an Able and Speedy Small Craft

A line of the well-known Gurnet dories, built by the Atlantic Company, of Amesbury, Mass., will be exhibited at the N. Y. Show. The showing will consist of a 25-foot "Gurnet" dory of 6½-foot beam, equipped with an 8-horsepower Atlantic motor, and particularly suited for a yacht's lifeboat. She combines excellent speed and unusual carrying capacity with seaworthy qualities of a high degree. In addition to this, they will show a 25-foot, specially designed launch from the board of Henry J. Gielow.

This boat has a 6-foot beam, and her power consists of a 10-horsepower Atlantic special engine, with reverse gear. This engine will actually develop 12 horsepower, making the boat an 11-mile craft. The finish is of mahogany, and fittings and equipment are of the best. The boat will undoubtedly attract an unusual amount of favorable attention.

An Atlantic 25-foot Gurnet Dory equipped with an 8-H. P. Atlantic engine. This makes an especially good lifeboat for a yacht.

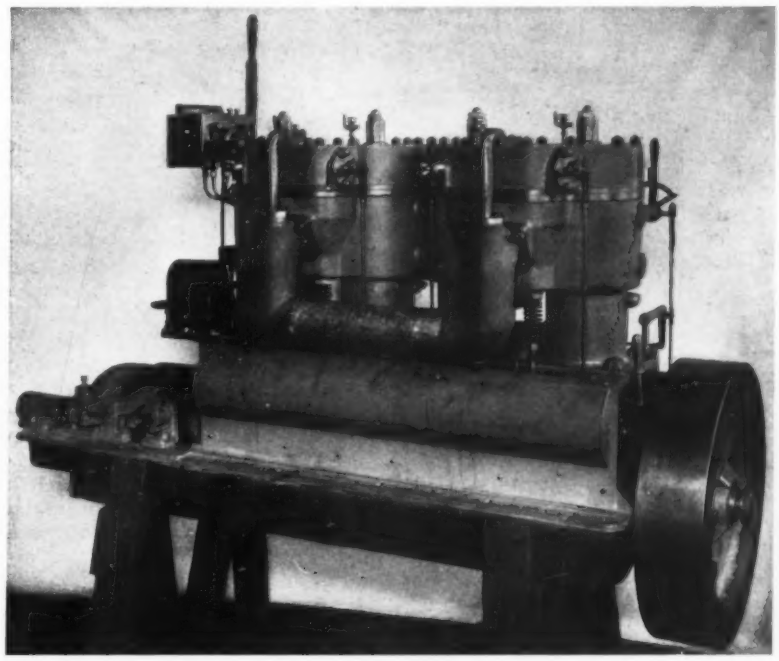
A Medium-Weight, Heavy-Duty Engine that is All Business

The exhibition of the Twentieth Century Motor will occupy space in Section C, and consist of the following motors: A two-cylinder, 5¾ by 7¼, 12-horsepower; a four-cylinder, 5¾ by 7¼, 24-horsepower; a six-cylinder, 5¾ by 7¼, 40-horsepower, and one four-cylinder, 6½ by 8½, 30-horsepower Twentieth Century Engine.

These engines are of the medium-weight, heavy-duty type, and are built for heavy cruising yachts and working boats. They are of the finest material and construction, and are neat and simple in design. The Twentieth Century is equipped with all the modern improvements of the gasolene engine, and is built with a heavy iron base, intermediate base and cylinders, the cylinders being cast in pairs. The crankshafts are made of open-hearth steel and the bearings are of more than the average length. The engines are equipped with marine thrust and removable thrust block.

The reverse mechanism is made up of planed, beveled gears, running in an oil-tight drum, with phosphorous bronze bearings, the clutch and clutch drum being of large diameter, giving great friction surface. The expanding dogs, of which there are two in number, are made of drop-forged steel, operated by a case-hardened steel cone.

The ignition apparatus consists of a low-tension magneto, gear driven, connected to make-and-break igniters. The oiling system is most complete, each and every bearing having separate direct-oiling device, the cylinders being oiled from a mechanically operated lubricator. The carburetor is of the float-feed type, with water-jacketed throttle, connected to automatic governor, the exhaust pipe is water-jacketed throughout, and water circulation is carried from cylinder to cylinder head by means of outside connections.



Four-cylinder, 24-H. P., 20th Century, four-cycle engine. This type is also built in 30, 50 and 80 horsepower.

These engines are well worth examining, and the attendants at the exhibition are very willing and ready to explain the engine in detail. The plant of the New York Yacht, Launch & Engine Company is situated at Morris Heights, at the end of the Sixth Avenue elevated, and any one who goes there will find their factory a very interesting plant, as they are also yacht builders.

25-foot Atlantic semi-speed boat, designed by Gielow. She will make 11 miles with a 12-H. P. engine.

A New Two-Cylinder and the Revival of an Old-Time Favorite

The Fulton Engine Company, of Erie, Pa., have secured space E, wherein they will exhibit their full line of engines. In addition to those shown last season they will place before the public for the first time a 6-horsepower, two-cylinder, two-cycle engine, developing its rate of horsepower at 650 revolutions per minute and weighing 290 pounds. The 1909 New York show will serve as a reintroduction to their 2½-horsepower engine, the manufacture of which was discontinued two seasons ago, but for which there has been such a steady and continuous demand that the company have decided to once more engage in their manufacture.

On all the Fulton engines the extension base will be supplied, allowing them to carry standard makes of reverse gears on the same bed-plate with the engine, thereby providing a very rigid construction, and rendering the installation of the motors very easy. In addition to this feature the engines will be equipped with interchangeable make-and-break or jumpspark ignition as heretofore, either of which may be used at the option of the purchaser. The make-and-break system will be operated in conjunction with a low-tension synchronized magneto when desired, the use of which entirely eliminates the battery question.

In addition to engines of their own make the Fulton Company will show a new production in the gasolene motor line—the Kent engine—a high-class, heavy-duty, low-speed, four-cycle motor of solid construction and fine design, which has just been put upon the market by the Kent Machine Works, of Brooklyn, through the selling agency of the Fulton Engine Company.

How to Apply Marine Glue to Seams of Decks

Among the many accessories for the motor boat will be shown marine glue for the prevention of leaky decks. Almost, without exception, unsatisfactory results in using this material are occasioned by faulty application and are produced entirely by two causes: First, either the oakum, or cotton caulking, or the seam is damp when the glue is applied, and if there is any moisture in the seam, as soon as the sun shines on the deck the heat will turn this moisture into steam, which will force the glue up over the edge of the seam; second, in paying the seam the ladle should be held at least an inch above the deck; if the ladle is drawn on, or close to, the seam, a quantity of atmosphere will envelope, and has no time to escape before the glue becomes set. This will cause air bubbles, which, in hot weather, will also force the glue up over the edge of the seam, leaving it hollow and unsound. The seams must be absolutely dry and clean before the marine glue is run into them.

If applied to old work, the old material should be dug out perfectly clean. Whatever adheres to the sides of the seam should be removed with a rase knife. Full directions for the proper use of this material can be had by applying to L. W. Ferdinand & Co., of 201 South Street, Boston, Mass.

A Safe, Seaworthy, Small Boat and Something New in High-Speed Engines

The Toppan Boat Manufacturing Company, of Boston, will exhibit one of their 18-foot Standard lap-strake dories of the latest 1909 type, equipped with one of the new 1909 Toppan two horsepower reversible motors. There will also be exhibited in the Toppan space samples of the single and double cylinder new type Toppan reversible motors, which are built especially for rough water work and are very durable. There are many Toppan features in these motors, which their long experience in both the boat and engine line has developed. All their engines are made with salt-water equipment and are of the jump spark, reversible type. They are of the two-port, two-cycle type and show the latest improvements. The exhibit will be in Space "D."

A Toppan Dory, built for rough weather.

Teermaat & Monahan engines, jointly with the Toppan Company, will be exhibited. There will be the single, double and triple cylinder of the T. & M. type. These engines are well known and show many features that are protected by patent. As a special attraction, which will no doubt appeal greatly to the speed-boat enthusiast, is shown one of the new 1909 type, 18 horsepower, two-cylinder, light-weight speed engines. This engine weighs only 300 pounds and is capable of driving a 22-foot boat of good speed lines at 19 miles per hour. This is the first time this engine has ever been exhibited.

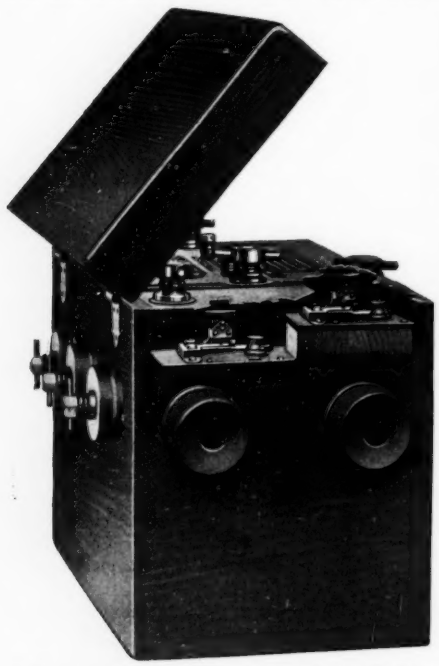
A New Carburetor, a Non-Spillable Funnel, and a Mighty Good Whistle

The Watres Manufacturing Company, of 1133 Broadway, New York City, who for some years past have made it possible for a motor boat owner to make the right kind of a noise, in the right way, and at the right time, have this year brought out two specialties which bid fair to attract as much attention and favorable comment as their very successful whistle.

One of these specialties is a funnel that will allow one to pour gasolene into the tank as fast as it will run without spilling. This funnel is built in the shape of two complete concentric funnels fastened together, and with openings so arranged that vapor from the gasolene passes up between the two shells and out through the holes around the inside of the inner funnel top. This device, eliminating waste in gasolene, will commend it to the motor boat owner.

The Watres Gasolene Funnel, the peculiar construction of which prevents overflow.

The new Watres carburetor described in the January issue of YACHTING will also be shown to an admiring audience, as well as the famous Watres whistle, whose simplicity and reliability have backed up the maker's claim that, once installed, the work is ended. The absence of pump to pack, of need for oil and of back pressure on the engine are three of the taking points in this standard noise producer.



End sectional View of Patterson Wireless Battery Holder, showing position of coils, outlets for high-tension wirings and switches.

A Model Showing and a Showing of Models

Whittelsey & Whitaker, Inc., of 11 Broadway, New York City, will occupy space on the main floor, to show the boat-buying public interested in motor boats of the cruising type, the practical ideas which they have evolved from another year's experience since the last show passed into history.

They will back up their claim to extended experience in motor boat designing by a line of models and photographs of boats of their design already constructed, and blue prints of boats now under construction and proposed, and it is highly probable that many a man who goes to the show with the idea of purchasing a stock boat will decide that his requirements can be better worked out by entrusting this firm with the design of his new boat.

Twenty Different Types from which to Choose

Palmer Bros., of Cos Cob, Conn., are so well known and have been established so long that their exhibit is sure to attract attention, showing, as it will, twenty different types of engines. Special attention is directed to the "Palmer" S, I and U two-cycle motors, and this firm invite a comparison of bore and stroke with other makers. Their yards are already filled with orders for various types of hulls in which Palmer motors have been specified.

A Patterson Wireless Battery Holder with coil compartment, enclosed in a mahogany case.

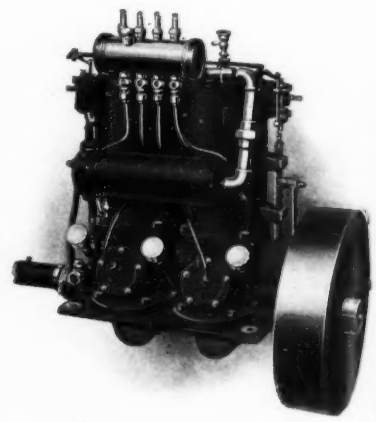
Flexible Tubing which Simplifies the Engine Connection Problem

The task of setting up exhaust, gasolene and circulation connections has always called for an amount of close figuring, thread cutting and an amount of material in the ways of T's and joints that has made it anything but a popular pastime.

With rigid piping a lot of pretty accurate figuring has usually been necessary in order to have the exhaust line as free from angles as possible and yet keep it from occupying too much valuable room in the cockpit. In order to reduce the friction as much as possible and yet render the exhaust piping inconspicuous, 45-degree joints and thread cutting, both of which are expensive, and the latter laborious, were much relied on. The flexible galvanized steel and copper tubing to be exhibited by the American Metal Hose Company, of 173-177 Lafayette Street, New York, in space No. 47, presents a solution of the difficulty which should certainly recommend the tubing to the amateur who does his own outfitting work, as well as to the professional boat builder, to whom every moment of time means actual cash.

The tubing, which is made in either flexible galvanized or flexible copper, ranges in internal diameter from 3-16 of an inch to 12 inches, and the diameter of circle which can be formed with it varies from 6 to 102 inches between these two extremes of size. For instance: a 1½-inch exhaust pipe of this material can be made to describe a circle of but 24 inches in diameter, which means that it can be made to conform to the lines or accommodation plan of any boat without any sharp bends to reduce the freedom of exhaust. For water circulation inlet pipes it is as flexible as rubber hose, and much more durable. For gasolene piping the smaller sizes are so flexible that there is no danger of injury to them through any shock or damage to the hull.

The flexibility of this piping renders it particularly adaptable for exhaust purposes, as it has the resiliency of a rubber hose combined with the durability and strength of metal. It is economical also, as a single length of the piping, with connections brazed or sweated on, can be bent into any desired shape and serves the purpose where otherwise there would be required various lengths of ordinary piping with intervening joints and thread cutting. Moreover, a few inches over-estimation of quantity required for any



A Palmer two-cylinder, two-cycle motor.

particular job does not mean pipe cutting or an alteration of one of the outlet points, as its flexibility allows a bend, greater or less as circumstances may warrant, to take care of the excess of material.

Meeting the Problem of a Dry Ignition Outfit

How to keep his dry batteries dry and his induction coils in the same condition is something that the motor boat owner has puzzled over since the early days of the internal combustion engine.

Short circuiting and the ruining of expensive coils on account of dampness have in the past been no small factor in the power boat owner's troubles. The very fact that a boat must necessarily be damp has called forth a large amount of both amateur and professional ingenuity in trying to circumvent the all-pervading moisture.

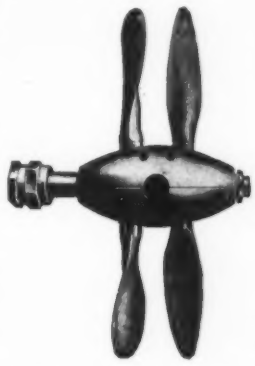
At the show, the Stanley & Paterson Co., 23 Murray Street, New York city, will exhibit a combination of ignition outfits which are absolutely moisture-proof. Their wireless dry battery holders are made of hard wood, double coated with zapon, the best water-proofing compound for this particular purpose, and the inside of the box is copper lined. The holder plate is of moulded hard rubber composition, and between this plate and the box is a heavy rubber gasket, against which turnbucklers with heavy lock washers force the plate down until there is no possible way for moisture to enter, even though the box itself may be submerged. The water-proofing itself is only one of the features of the battery holder, which is so arranged that all wiring connection between the dry cells is dispensed with.

The dry cells for use with this outfit are fitted with a screw-headed metal casing, which allows of their being screwed into the battery holder, in which copper bridges form connections instead of wires. In the higher grades of this battery holder the bridges are so arranged that one or more dry cells may—irrespective of their position—be removed, and the space between them automatically bridged. This allows the removal of one or more dead, or partially exhausted, cells from the battery set without interrupting the spark circuit. These sets are furnished to accommodate six or eight dry cells, or with a separate compartment in which one or more coils are stowed, connection between batteries and coils being made with knife blade contacts, eliminating all low-tension wiring between coils and batteries. With a combination battery and coil outfit such as this, short circuiting is eliminated as far as possible.

Not content with these outfits, Stanley & Patterson have just produced what they call a Universal Wireless Holder Plate, by means of which the current may be regulated. This is one of their wireless holders, so arranged that by means of three outside plugs, absolute control of an eight-cell battery is possible. For example, all eight cells may be used in straight series, all in multiple series, or four cells, either in straight or multiple series, may be kept in service while the remaining four are held in reserve. It is also made in twelve-cell sizes. Just what may be obtained in the way of variations by the manipulation of the governing plugs is shown below in tabular form:

CURRENT AT BINDING POSTS.

Position of Plugs.	8 No. Plates.	Initial Voltage.	Initial Amperage.	12 No. Plates.	Initial Voltage.	Initial Amperage.
Two outside plugs down, center plug up.	Two sets of four cells in multiple series	6	50	Two sets of 6 cells in multiple series	9	50
Left-hand plug down, all others up.	Rear row of four cells in service, front row in reserve	6	25	Rear row of 6 cells in service, front row in reserve..	9	25
Right-hand plug down, all others up.	Front row of four cells in service, rear row in reserve	6	25	Front row of 6 cells in service, rear row in reserve	9	25
Center plug down, both side plugs up.	8 cells in straight series	12	25	12 cells in straight series	18	25



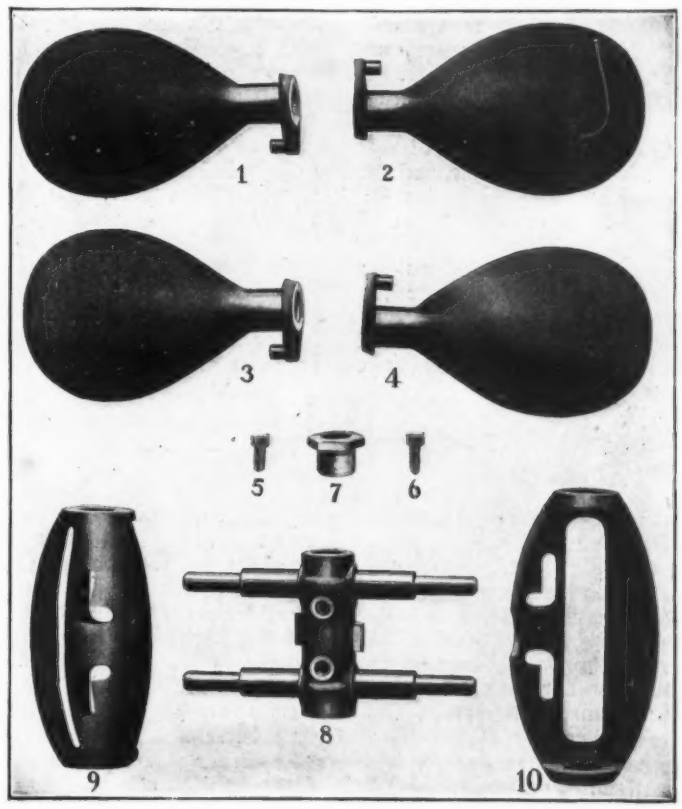
Roper speed, reversible propeller, showing position of the two sets of blades.

The last combination of eight or twelve cells in straight series is an extremely good one on which to fall back when the cells are pretty well run down. The eight or twelve cells in straight series then being equal to about four or six new ones.

For Altering the Speed of the Boat Without Increasing or Decreasing the Number of Revolutions of the Engine

One of the disadvantages of the reversing propeller as heretofore built has been that, with the alteration of the angles of the blade surface to the water, there has been a variation of the load on the engine. Consequently, there was more or less manipulation of throttle necessary in conjunction with the operation of the reverse lever of the propeller. The Roper safety propeller, built by C. F. Roper & Co., of Hopedale, Mass., which will be exhibited at this show, is a most ingenious combination of two two-bladed propeller wheels set tandem in a single hub, with the reversing mechanism so arranged that no matter at what angle the blades are set, the load on the engine, and therefore the number of engine revolutions per second, remain precisely the same, whether the boat is going ahead or astern, at full or reduced speed, or is at rest and drifting with the blades set at neutral.

The construction is very strong and simple. The propeller consists of a "spider," four blades, a two-piece hub and a locking screw. The "spider" or frame is set-screwed on the shaft, which is driven directly from the motor. It is an "H" shaped casting, the cross-bar of which is bored to receive the shaft, and the four legs are turned and finished to act as bearings for the blades to turn on. These bearings extend up into the blades nearly to the centre of pressure upon them, thus preventing cramping. The blades are designed along the lines of a perfect screw, and therefore have a constant pitch for all working parts of the surface. They are provided with arms having lugs which work in cam slots in the hub or outer casing. Between these arms and the casing they also have a circular ridge, which prevents any possibility of the blades coming off of their bearings, or out of the hub, should the spider be accidentally broken. The hub or casing is made in two sections, which overlap at the ends and are joined together by large screws passing through both sections. At one end this screw is hollow, fitting snugly on the shaft, and at the other end the controlling sleeve is threaded and forms the screw lock. This construction is very simple, strong and efficient in locking the parts together. By the motion of the sleeve and hub lengthwise of the shaft the cam slots act upon the blade arms to move the blades through the various positions corresponding to the different speeds of the boat. When the blades are set for full speed ahead the sleeve and hub are in the extreme forward position. As they are moved backward by the controlling lever, the front pair of blades start to turn upon their bearings toward a position in a plane at right angles to the shaft. This reduces the pitch of the blades, and consequently the speed of the boat. Were this pair of blades the only pair, the motor would immediately speed up and begin to race as the pitch is reduced, owing to the decreased resistance of the water on the blades. But the rear pair of blades have not moved from their original position, and do not do so until the other pair pass the position of least resistance. Thus the load on the motor is kept uniform, for we find that one pair of blades has practically the same resistance as two of the same pitch. When the first pair of blades pass neutral position, tending to reverse the boat, the second pair begin to turn toward neutral position. This forms a wedge in the water, the two pairs of blades working against each other, and the load is still substantially uniform. When the reversing action of the first pair of blades becomes stronger than the forward propelling action of the second pair, the boat begins to run backward. Finally, both pairs reach reversing position and the same extreme pitch. This gives full speed astern. The principle holds in passing from



The component parts of a Roper Propeller.

reverse back to full speed ahead, as there is no possible position of the blades which does not put substantially the same load on the motor.

A Compact, Simple Clutch, and a Propeller that Delivers the Speed

The McFarland Foundry & Machine Co., of Trenton, N. J., will show a line of their celebrated Harthan reverse clutches, of which some of the taking features are simplicity of construction and compactness. The clutch mechanism is enclosed in a casing which prevents the grease or oil from flying over the boat. This clutch is arranged with two sets of flange couplings, one set of which is for the engine end of the clutch and one set for the propeller end. These are securely fastened to the clutch spindles, but the upper halves have cored holes of small size, to allow a boring to propeller or engine shafts, which simplifies the operation of clutch connections.

The Harthan Wheel, built on the true screw principle.

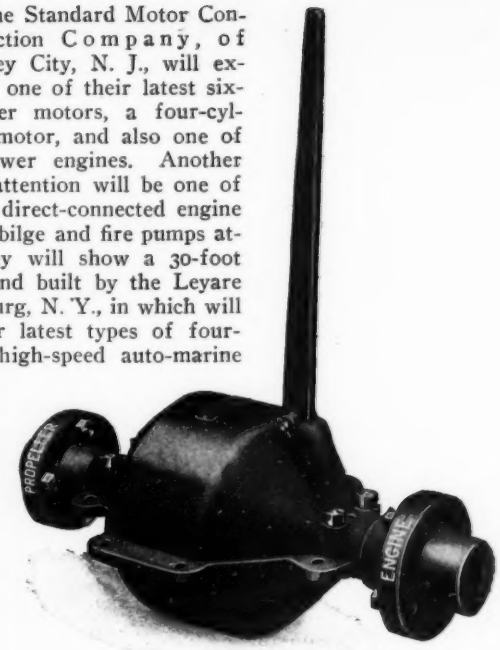
The matter of propellers is pretty near to the heart of the man who is considering the installation of reversing gear. This is one of the reasons that the Harthan propeller will attract much attention. The other reason is that the Harthan has a reputation of thirty years behind it, during which time not one of them has been known to break. The Harthan propeller is a solid wheel made on the principle of a true screw. All patterns from which these propellers are made follow this principle, and the great number of patterns which the McFarland Foundry & Machine Co. continually carry in stock enables them to furnish immediately a wheel of practically any pitch that may be desired. It is the claim of the manufacturer that the Harthan is equally serviceable for high-speed cruising or towing, and while it has never been heralded as a weedless wheel, it has demonstrated its value in this respect.

The matter of pitch has been carefully studied to give the best result, and all those who have used this wheel testify to the satisfaction it has given.

Standard Engines and a Boat that's a Beauty

The Standard Motor Construction Company, of Jersey City, N. J., will exhibit one of their latest six-cylinder, 40-50-horsepower motors, a four-cylinder, 25-35-horsepower motor, and also one of their latest 8-10-horsepower engines. Another exhibit that will attract attention will be one of their little 1½ kilowatts, direct-connected engine and dynamo outfits, with bilge and fire pumps attached. In addition, they will show a 30-foot speed launch, designed and built by the Leyare Boat Works, of Ogdensburg, N. Y., in which will be installed one of their latest types of four-cylinder, 25-horsepower high-speed auto-marine engines, equipped with the latest improvements, such as low-tension, gear-driven magneto, mechanical lubrication, phosphor bronze bearings and quick-acting reversing gear.

This launch is a very handly little boat, capable of high speed and with a good amount of room for a boat of this type, and should prove very serviceable.



The Harthan Reverse Gear, in which all mechanism is encased.

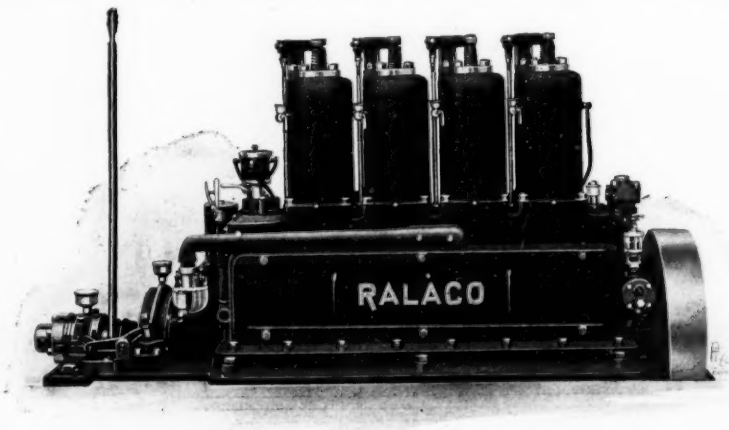
A Raised Deck Hunting Craft of a New Model

The Racine Boat Manufacturing Company, of Muskegon, Mich., will exhibit the same type of cruising craft which they had on view at the Boston Show, and which were fully described and illustrated in the Boston Show supplement of our January issue. These cruisers, of 25 and 28 feet respectively, are equipped with 8-horsepower, two-cylinder, two-cycle, slow-speed, heavy-service Racine engine, with a bore of 4½ inches and 5½-inch stroke, and with a three-blade, 22-inch solid bronze propeller wheel, with bronze bearings, shaft and reversing clutch.

A Splendid Collection of Engines Well Displayed

The Fairbanks Company, corner of Elm and Broome Streets, New York city, will, during Show Week, hold an engine show of their own on the sixth floor of their building, where they will exhibit a full line of Fairbanks two-cycle engines, ranging in horsepower from 1½ to 25, and made in from one to three cylinders. Their Victor engines, from 1½ to 20 horsepower, are built with one and two cylinders, while the four-cycle Ralaco of 10 to 50 horsepower has from two to four cylinders, and the four-cycle, automatic engines of from 6 to 150 horsepower range from the one to six cylinder types.

In addition to the above they will show several stationary engines and some very complete and attractive electric lighting outfits suitable for isolated plants and yacht lighting. The line of engines described covers the requirements of the motor boat enthusiast, whether he be desirous of equipping a fast runabout, a moderately heavy family boat or a full-bodied cruiser or working boat; and should a prospective purchaser be in any doubt as to just which of the engines described will best fit his purpose, the experts of the Fairbanks Company will give him helpful advice and suggestions regarding the type of engine best adapted to his needs and the method of installation calculated to produce the best results in the craft to be equipped.



30-H. P., four-cylinder, four-cycle Ralaco Engine, shown by the Fairbanks Co.

A Noteworthy Power Yacht

One of the most successful motor yachts built recently, is the Patricia, designed by Henry J. Gielow and built by The W. F. Ruddock Boat and Yacht Works, formerly at 141st Street and Harlem River, but now settled in their new plant at 214th Street and Harlem River, where they have a much larger plant and are better equipped for building larger boats, having the latest machinery and appliances. This boat was built in the most careful manner and from the best material on the market. The owner, a New York yachtsman, spared no expense in her construction, as he desired to get the best results. She is 61 feet overall, 10 feet 9 inches beam, the draft of hull being 2 feet 6 inches. She has two deckhouses, the forward one being 9 feet in length and the after one 19 feet 9 inches. The latter is divided into a main saloon and an owner's stateroom. The houses outside are of selected mahogany and paneled; the interiors being finished in white enamel, making them light and cheerful. The main cabin has two extension berths, china closets, buffet and sideboards, with lockers under berths. In the owner's stateroom are two berths with a mahogany bureau and a large plate-glass mirror. Between the two cabins is a large clothes closet on the starboard side and a toilet room on the port side. Under the bridge deck, between the houses, is the engine room, with a berth for the engineer and a work bench. In the forward house is the galley, fitted with plenty of closets, lockers and a good size icebox, and forward of this is the forecastle, with hammock berths for the crew.

The power consists of a 25-horsepower Standard engine, giving a speed of 12 miles per hour, and the craft is lighted by electricity, having a dynamo and storage batteries. The boat has been greatly admired by yachtsmen and reflects much credit on her designer and builders.

The Publishers of Yachting tell us that their readers are interested in motors—

their construction and the improvements of leading builders.

They state that you are ready to read our handsome catalogue or visit our New York Show Exhibit to study the New 1909 Ferro Motors, the Ferro Reverse Gear, the Ferro Rear Starting Device, etc., if we talk to you through this magazine.

If this is true you will ask for our catalogue or visit our exhibit. If it is not true, we will not continue to address you through this magazine. We cannot afford to talk to an audience that does not want to hear.

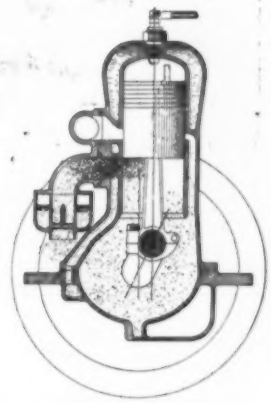


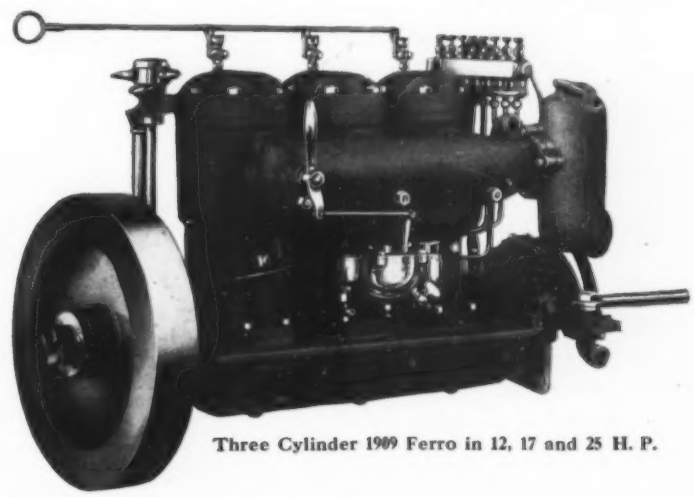
Diagram showing Ferro Offset Cylinder

If you want to study the late progress in motor building write for the 1909 Ferro Catalogue

Describing fully

Ferro Motors

in 10 sizes—1, 2 and 3 cylinders—from 3 to 25 H. P. These are of advanced type with offset cylinders and other modern improvements. It is impossible to mention details in this space.



Three Cylinder 1909 Ferro in 12, 17 and 25 H. P.

The Ferro Reverse Gear

Ferro Reverse Gear

Positive in action. No slip or grind.

Attachable to any marine motor. Simple adjustments to both forward and reverse brake bands.

Also adjustment for end thrust of propeller shaft.

Sizes for small and large motors.

Ask for Ferro Gear Catalogue.

5,000 Ferro Specials

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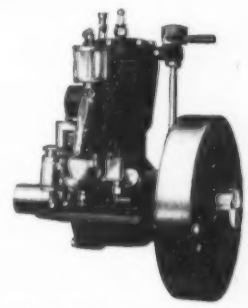
These 3 H.P. motors are the best that money can build, latest design, best material and workmanship. The quantity brings down the price. So good a motor has never been sold before at anywhere near the price.

If you want a high grade Motor for launch, canoe, dinghy or auxiliary yacht get a Ferro Special and ask for catalogue showing this engine.



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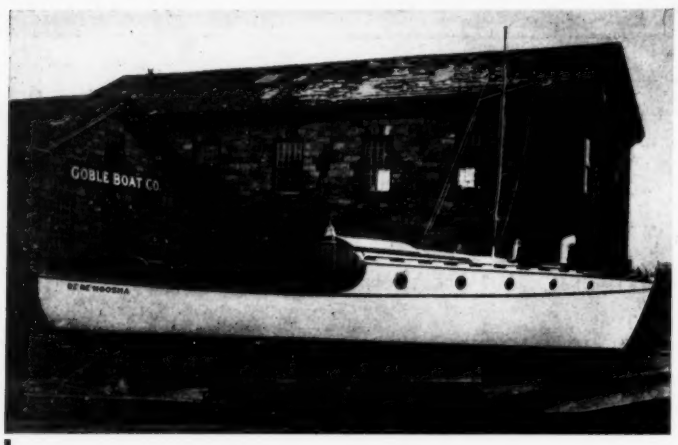

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Outfits No. 4, 5, 6 and 7

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as shown by the accompanying cut with the exception of the engine. Prices range from

$7.00 to $30.00

Over **30,000 "Yankee" Mufflers in use** on automobiles and marine engines. **Asbestos lined, riveted seams and water cooled when necessary.** The only muffler made that will take care of any gasoline engine **without back-pressure** at all speeds of the engine, and **silent.** Made in various sizes from ½ to 150 H. P.

The **automatic brass air cooled valve** attached to cylinder of engine is provided with **flame destroyer,** preventing **any flame from entering the valve,** the **explosion must take** place in cylinder of engine **or valve will not open. No live gases enter tank.** The whistle is blown by **spent gas taken** through 1/100 part of an inch opening in the radiator check valve and stored in the tank. **Takes no power from engine** and may be used with **any engine from ½ H. P. up.** After tank is full of air it equals the compression in the cylinder, and the operator **always has a good pressure of air to blow whistle with continued blast** whether **engine is running or not.** The whistle is a **4-toned musical chime whistle, giving a deep pleasant sound that can be heard for several miles.** All **parts brass, highly polished.** The outfit can be installed in a very few minutes by anyone with a monkey wrench. **See our exhibit** at the **Motor Boat Show,** New York, Feb. 15th. Write for prices and descriptive booklet. Each outfit fully guaranteed or money refunded.

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New York City Agents, H. B. Drake & Co., 90 West St.; Boston, Mass., Agents, Gordon Automobile Supply Co., 1024 Boylston St.; Canadian Agents, The Canadian Fairbanks Co. Montreal, Toronto St. John's, Winnipeg and Vancouver; Detroit, Mich., Agency, C. M. Jacobsen, 238 Jefferson Ave.

For the Honor of the Fleet

(Continued from page 106.)

which, even at that distance, spoke her sore distress. She disappeared as both vessels sank into the hollows, and shot into view again as they rose.

"Tail on to th' main sheet; flatten her right aft. That'll do! Now your foresheet an' heads'ls," sang out "Red," taking the wheel and swinging his vessel up for the wreck.

Close hauled and plunging bows under in the seas, Nourmahal clawed her way stubbornly towards the schooner, the entire crew lining the rail with eyes riveted on the sodded hull.

"It's a Gloucesterman! Looks like ole man Ellis's Ethel T," spoke up one of the Cape Ann boys.

"She's in bad shape," said the mate, with the glasses to his eyes. "Rail all gone amidships an' they're havin' their own troubles keepin' her on top. Must have been caught nappin' in that gale that chased us along. Looks to be like one of our fleet, but I can't make her out with her top-hamper gone."

They could now see a group of yellow figures huddled under the stump of the mainmast, and it did not need the white blanket of foam that ran down her black sides to tell them that these were laboring at the pumps. "Red" reached for the glasses as the mate took them from his eyes and took a long look. The boys waited, expectantly.

"It's Loney Thomas in the ole Grace Manta, as sure as there's cod on the Banks. He's in the hell of a pretty mess, too. Guess he ain't sorry we happened along right now."

They worked slowly up to windward of the wreck, as close as they dared, and lay to with forestaysail backed, near enough to hear the chug, chug of the pumps. The men working them did not even stop long enough to take a look at their rescuers. Through the megaphone "Red" hailed—his voice carrying down the wind.

"What's the trouble, Loney? Can I render any assistance?"

The answer came back so faintly to their straining ears that they caught but part of it.

"Dismasted—Tuesday—heavy gale—keep her afloat—boats gone—."

"We'll take you off. Send our own boats after you." Then to his own crew, "Get the lashin's off a couple of those dories an' stan' by."

Again the answer came indistinctly.

"Don't want—leave—think—mebbe—save her. Will you give—tow?"

The men aboard Nourmahal looked at one another in amazement. If ever a boat was in her death throes, it was the Grace Manta. "Red" took his schooner under the other's stern, where he could hear better.

"Why, man, you're crazy!" he shouted back. "She won't float two hours. Even if you do keep the water down, I could never get you to port through this sea. You'd better come aboard here."

Loney shook his head sullenly. "I can't give her up so long's there's a chance o' savin' her. There's two thousand quintal under decks—a hull season's work, man—I can't let that go. There's only five feet o' water in her, an' while I can't get the better of it, it ain't gainin' none. There's a fightin' chance, if you'll give me a tow."

Elliott thrashed it out quickly. It was plain the schooner's case was worse than Loney put it. It was only his anxiety to save her that blinded him to the truth. Even though she could be kept afloat for a while the first sign of a blow would finish her. The wind was not fair for putting into some Nova Scotia port, and if he squared away for Provincetown, a good 800 miles, he would never get her there. The chances were too much against it for him to lose what he had at stake by trying it. The schooner was insured, he knew

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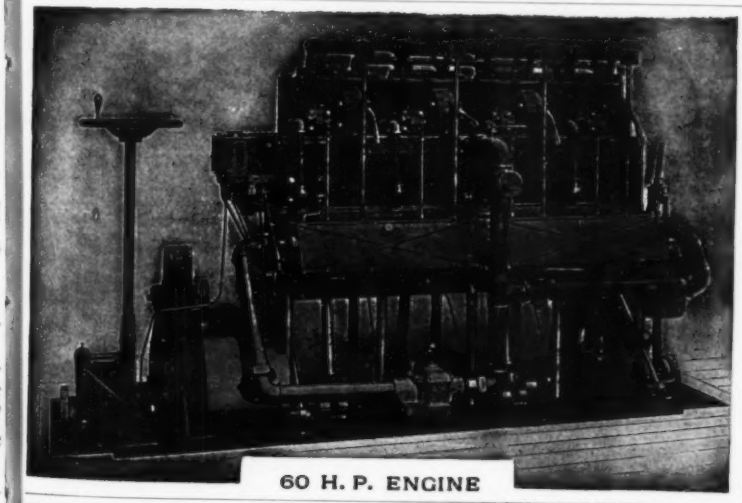

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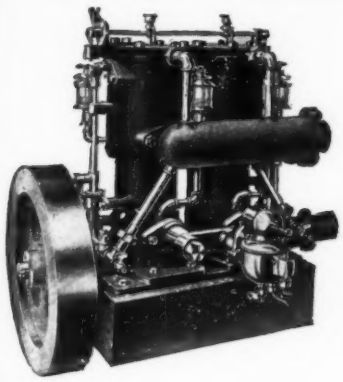

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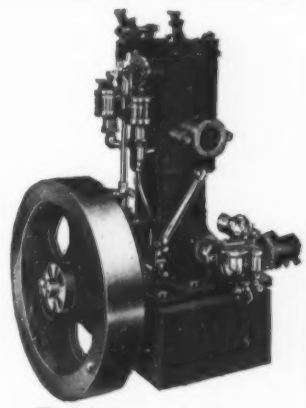

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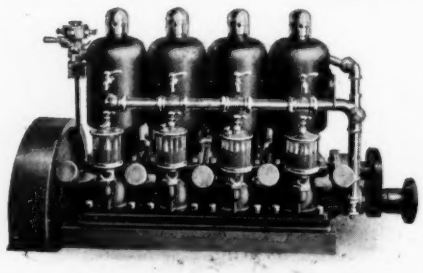
Bridgeport, Conn.

The Fraser Engine



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Built in 6 to 32 h. p., 1 to 4 cylinder

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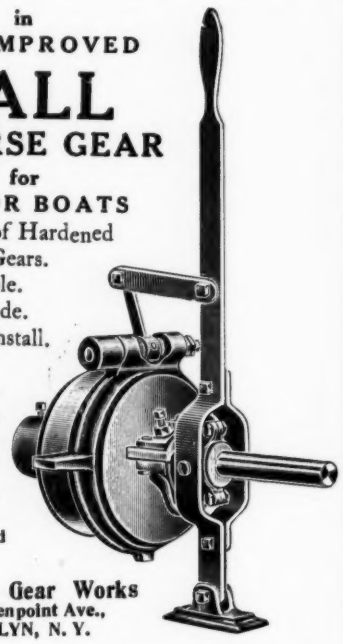

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Manufactured by

New York Gear Works
56-58 Greenpoint Ave., BROOKLYN, N. Y.

All that the men would lose would be their lays, and many a Bank fisherman had lost a season's pay before this, and counted himself lucky to get off with his life.

He saw his own crew looking towards him, expectant of his answer.

"Can't do it," he shouted. "We'd never get you there. But I'll take you all off an' land you at Provincetown. Make up your mind, quick, though; we can't hang on here long."

There was a moment's hesitancy before the answer came back, as if it were a hard question to decide.

"No! I won't leave her jest yet. There'll likely be another Banker passin' this way whose time won't be so valuable but what he can give us a lift towards the coast."

"All right! As you will! But remember, your packet ain't new an' may dive under most any minute. Do any of your men want to come?"

They could see Loney putting the question to them where they toiled at the pumps. For a short time only they weighed the matter, and then the answer was hurled back defiantly, with almost a note of triumph in the tone.

"No! They all say they'll stick by the vessel. Report me in Provincetown when you arrive."

"Red" grabbed the wheel of Nourmahal and flung it hard up. She swung off on her heel, gathered headway, and with eased sheets stood off under the lee of the wreck on her course. Elliott, with jaws tight set and gripping hard the spokes of the wheel, muttered, under his breath: "Damn him, anyhow! I know why he's so anxious to save his lay just now. Any other time he'd leave her, quick enough, in the condition she's in. It's sheer madness to stay."

Driving southward in the waning afternoon they sank the schooner rapidly astern. The crew of Nourmahal were gathered at the taffrail with eyes fixed, as if fascinated, on the receding wreck, while "Red," having turned the wheel over to one of the men, paced the weather alleyway, his face set and hard as a rock, and hands clenched at his side. Over the lonely Atlantic the early darkness was creeping, and in the dreary waste astern the stricken schooner lifted on the seas, her jagged stumps where masts had once been showing nakedly against the skyline like the outstretched arms of a drowning person, and her battered hull sinking lower and lower. In his walk "Red" paused at each turn to watch her as she would shoot into view, wondering at every lift if she could last much longer.

He missed her at last, though he stopped, scanning the sea eagerly. A minute passed; two minutes—and still she did not rise above the darkening cotton-tops astern.

"God help 'em!" the words dropped instinctively.

"There she is!" as one man, the cry involuntarily rises as she lifts once more, pointing her graceful bow, with its broken bowsprit, skyward.

With an oath "Red" sprang to the wheel, knocking away the helmsman's grasp and seizing it himself.

"Wear ship!" he yelled. "Let go the boom tackle; stand by the crotch ropes!"

Jamming the wheel hard up, "Red" brought her around till the heavy boom slammed over and her head pointed back towards the wreck, over the wake they had just made. It was no easy matter to find her in the first blackness of the night, but presently a white light ahead, shining fitfully from the stump of a mast, told them that the object of their search was still afloat.

"Get that new ten-inch hawser up out of the fore peak," ordered Elliott, as they neared the wreck. "Bend on a spring line an' clear one o' them dories."

He was obeyed, quickly, by willing hands, and when he had brought his schooner to, it was

Hotel Lenox

ONE OF THE FINEST MODERN FIRE PROOF HOTELS IN THE COUNTRY. TWO MINUTES' WALK FROM THE BACK BAY STATIONS, AND ONE BLOCK FROM COPLEY SQUARE :: :: :: :: :: :: ::

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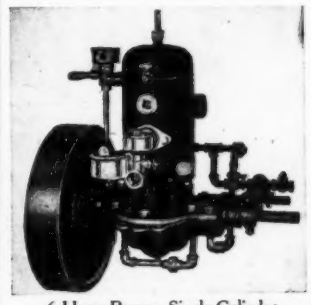

6 Horse Power, Single Cylinder Victor Marine Motor, 1908 Model

Robert S. Hill, Machinist and Engineer

Testimonial

Binghamton, N. Y.
August 15, 1908

Mr. R. S. Hill,
24 E. Woodbridge St.,
Detroit, Mich.

Dear Sir: I am indeed sorry to have delayed answering your letter, but we left here July 9th for a trip on the launch and did not return until this morning. Our run was over 1,000 miles, and your "Victor" engine never made a slip or slow up once on the entire trip. Enclosed find check to cover amount of your bill.

Signed, A. B. SAWYER

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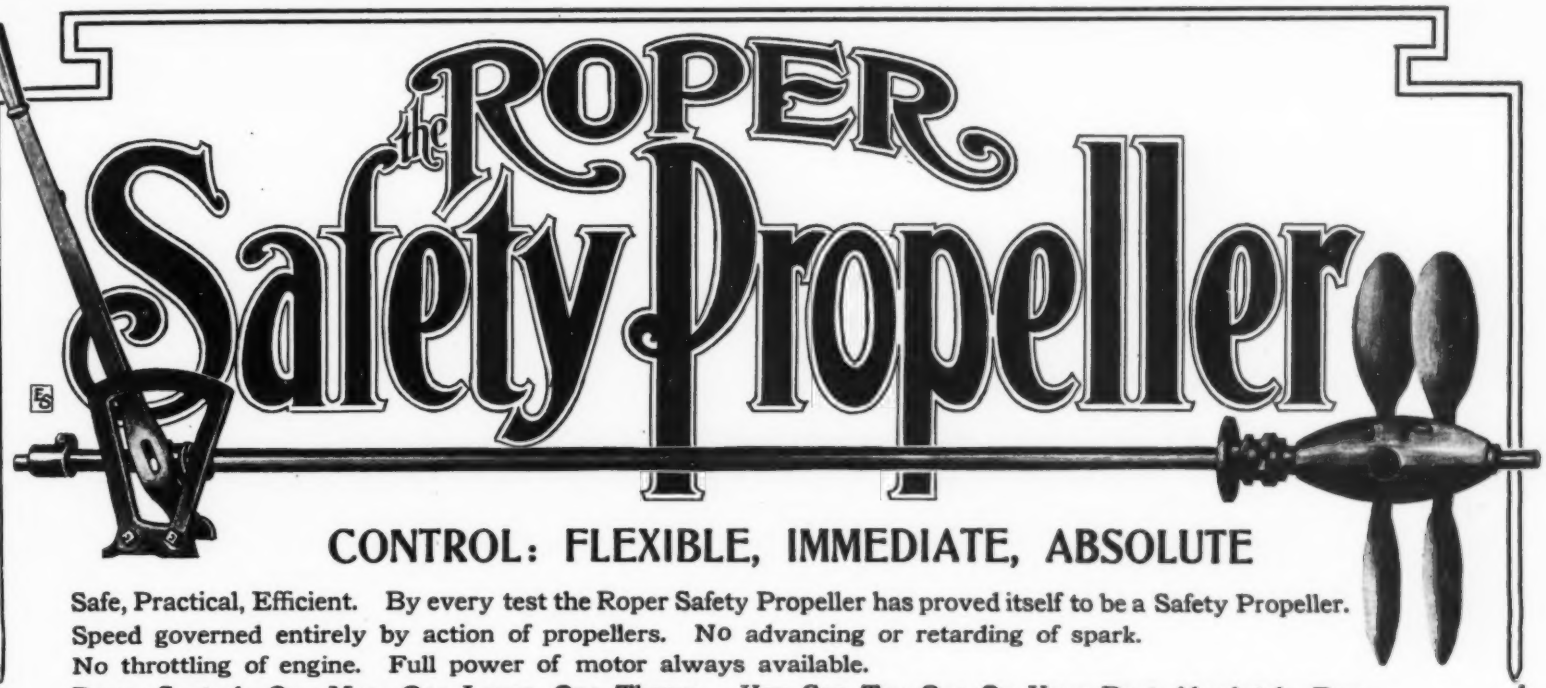
the ROPER Safety Propeller



CONTROL: FLEXIBLE, IMMEDIATE, ABSOLUTE

Safe, Practical, Efficient. By every test the Roper Safety Propeller has proved itself to be a Safety Propeller.
Speed governed entirely by action of propellers. No advancing or retarding of spark.
No throttling of engine. Full power of motor always available.
Roper Control: One Man, One Lever, One Throw. You Can Try One On Your Boat Absolutely Free.
The unparalleled success of the Roper Safety Propeller has led us to make the following

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We will send a Roper Safety Propeller, freight prepaid anywhere in the United States, to any person sending us a request and giving us satisfactory references. We will let him use the Propeller for thirty days on his own boat, free of charge, with the agreement that if it shall fail to perform as represented and guaranteed by us he can return it at our expense, without having to pay us so much as one dollar; but also with the agreement that, if he finds it to be entirely satisfactory, he is then to pay us for it in cash or by draft, certified check or money order, when it is to become his property. Write to us now for full detail information and convincing literature. Visit our Exhibits at the Boat Shows.

Address: C. F. ROPER & CO., HOPEDALE, MASS.

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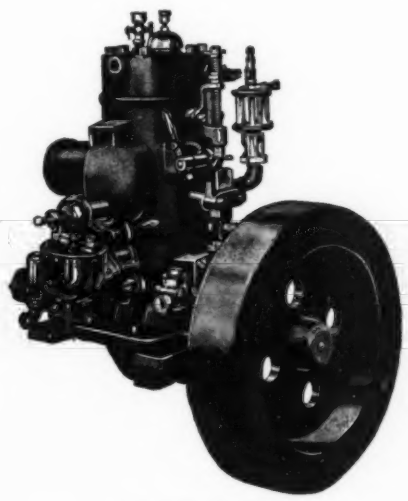
MAKE and BREAK IGNITION
Sizes, 2½ H.P. to 15 H.P.

HIGHEST CLASS OF WORKMANSHIP

2 Cycle
2 Port
Water Cooled Exhaust
Single and Double Cylinder



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Medium and Heavy Duty
Highest Known Power for Size of Motor

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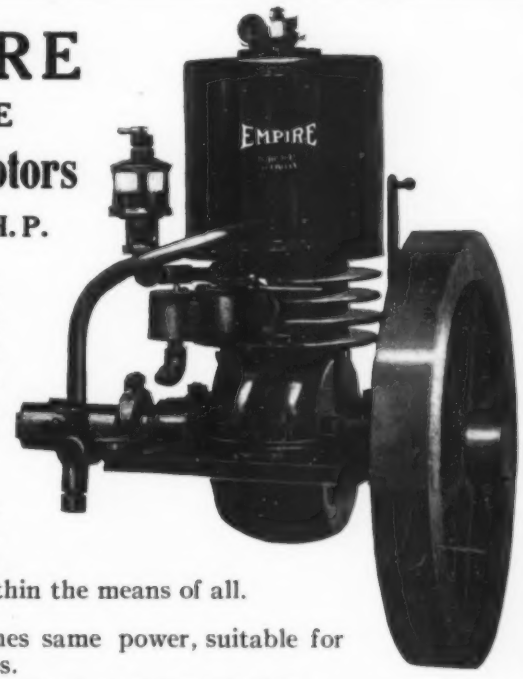
EMPIRE

2-CYCLE

Marine Motors

1½ and 3 H.P.



A perfect type of two-cycle jump-spark engine, medium weight, simple, and above all, economical.

Full salt-water equipment, including bronze shaft. Price within the means of all.

Stationary engines same power, suitable for small boat shops.

RELIABLE AGENTS WANTED
EXHIBIT AT NATIONAL MOTOR BOAT SHOW

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DUCK

Ask the Winners

HERE ARE TEN WINNERS WHICH HAVE CROSSED THE LINE FIRST WITH LOWELL DUCK

ELMINA II	CHERRY CIRCLE
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THERE ARE HUNDREDS OF OTHERS

Regular for Cruising
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"THE PERFECTED MOTOR BOAT
NOISELESS AND SAFE
Also Clipper Launches, combining everything you need in a boat —power, speed, safety, comfort, superlative seagoing qualities.
Also Atlantic Motors from 3 to 15 H. P., 1, 2 and 3 cylinders.
The Atlantic Co., Amesbury, Mass., U. S. A.
SEND FOR CATALOGUE.

SAMSON SOLID BRAIDED CORD
for halyards, tiller rope (special tiller rope with wire center), log lines, hand rails, etc.
Best Material, Perfect Braid.
Samples and full information gladly sent.
Samson Cordage Works, Boston, Mass.

"Red" himself who hailed, with all the power of his lungs, as if to let out the pent-up turmoil of his soul.

"Grace Manta, ahoy! Stan' by to take a line. I'll send one down in a dory with a new hawser on the end of it. Take a turn 'round the stump of your foremast, an' when it's made fast burn a flare an' I'll head off sow'wes' by sow'. Stan' by to catch the boat as she comes alongside. Do you understan'?"

"Aye, aye," came back the answer. "Is that Nourmahal?"

"Red" did not reply to the query, but shouted across the water once more: "As soon as it's daylight I'll send some of my boys over to spell you at the pumps, an' those you can spare you'd better send aboard here to get rested up. They must be near beat."

They launched a dory into the blackness, a couple of the boys sprang in and the rest stood by to pay out the line as she drifted down to leeward towards the wreck, disappearing in the weird, phosphorescent glow of the curling sea tops. They waited till they began to fear that the dory had missed her goal, but presently there was a steady strain on the spring line that told them she had reached the schooner, and they began to run out the hawser. At last they saw the flare burn uncertainly, as if water-soaked, and picking up his burden, "Red" struck the long trail towards the coast.

The ocean was kind to them and at the end of eight days Nourmahal, with her sodden tow still trailing astern, like a refractory pup on a leash, dropped anchor back of Long Point, and the labors of the tired crews, who felt that in those eight days they had pumped the whole Western Ocean through the leaking schooner, were at an end. "Red's" sharp eyes noted that Ringleader was not only in, but half discharged, and as he stepped ashore later, "Bully" McLoughlin, with a broad grin on his face, was the first of the crowd to grip his hand. But what a certain maid said to him when he met her that first night, at her request, "Red" has never divulged, yet no one has ever heard him utter a complaint at losing his maiden race in his new schooner to such an old hand at the game as "Bully" McLoughlin.

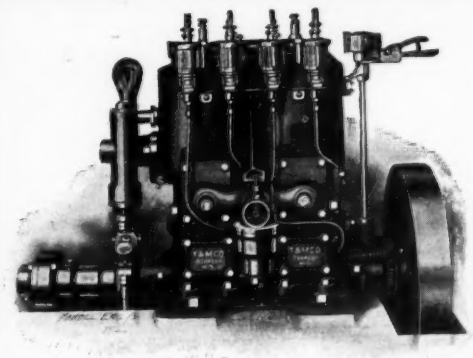
The Sonderklasse

(Continued from page 107.)

of boats in this class at other places. As compared with the crafts built under the universal rule, the *sonder* boats have much fuller, flatter ends, and have not the pinched look at the bow and stern which characterize the former. They appear to be fully as seaworthy, and at Marblehead this year, in breezes varying from 15 to 20 miles an hour, a *sonder* boat, on a triangular course, has twice beaten the class Q entries, boat for boat, although the Q boats are about 5 feet longer on the waterline and carry about 300 feet more sail. This is a remarkable performance for the smaller boat in such heavy weather, and shows the ability of the craft built under this rule to attain high speed under strong conditions.

It would be a help to small-boat yachting if the class were developed at other places and under different weather conditions, especially as next year, or the year after, we shall be called upon to send three of these boats to race at Kiel, where wind and sea of a strenuous order may be expected.

The prospects for a successful racing season at Marblehead next summer are brilliant. Spurred on by the hope of winning an International Cup in the coming races with the Germans many men well known in small-boat racing are ordering boats of the best designers in the country.



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ALWAYS LEAD
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ALL STEEL——GREAT STRENGTH
Instantly adjusted. Easily and quickly operated. Positive grip. Immense **time, trouble** and **temper** saver. **Indispensable to Automobilists.** Best "all-round" tool ever offered for sale. **Must be seen** to be appreciated. "You'll **want one** when you see it." For circular, address
The Perfection Wrench Co., Box 426 T. **Port Chester, N.Y.**

Our Sails on the 30-Footers

The boats we fitted out last season, were the first to finish in the races. Next year will see our sails on a great many of the best boats in this country.

JONES & ROBINSON
Manufacturers of the J. and R. Perfection Spray Hood
City Island, NEW YORK CITY

TANKS
GALVANIZED OR PAINTED
GASOLENE TANKS
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NO BOAT COMPLETE WITHOUT

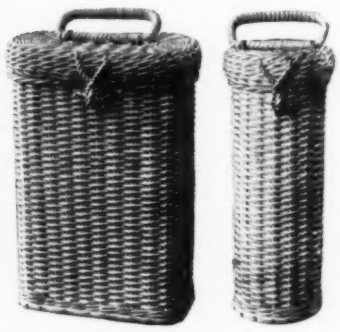
THERMOS BOTTLES

Nothing has ever added so much to the pleasure of yachting and boating as the invention of the Thermos Bottle, for it enables you to serve drinks ice cold or steaming hot to your friends on board or on some distant shore even more easily than you could serve them right in your own home. The hot food that lack of fire formerly made impossible, with the Thermos Jar becomes no trouble at all.

THE THERMOS BOTTLE

Keeps Hot Liquids Steaming Hot for 24 Hours
Keeps Ice Cold Liquids Ice Cold for 72 Hours

Beware of imitations and infringements. The Thermos is the original and only perfect temperature-retaining bottle as temperature tests prove. Guaranteed by over 30,000 dealers throughout the world. The Thermos Bottle lasts a lifetime. Filled, cleaned and emptied the same as any ordinary bottle.



You can also get handsome combination cases for Thermos Bottles, a few being illustrated here.

700,000 SOLD IN 1907

If your dealer cannot supply you, we will ship direct, prepaid on receipt of price. **Pints, $3.75. Quarts, $5.75.**

THE THERMOS JAR

does for solid foods what the Thermos Bottle does for liquids. Specially valuable for cruises or trips of any kind.
Price, $15.00

No. 32 is a combination Hide Case designed to hold either three Thermos Bottles (pints) or two bottles and a lunch box. Lined with plush. Carries hot and cold food and drinks for three persons. Price of case only.....$6.50

No. 26 is also made of hide, holds either two Thermos Bottles (pints) or one bottle and a lunch box. Lined with plush. For one or two persons. Price of case only.....$5.50

No. 25 is a first-class brown canvas case, lined with plush—handsome, durable. Holds two Thermos Bottles. Price of case only, pint size, $2.50; quart size, $3.50.

Write today for Free Booklet

American Thermos Bottle Co., 517 Fifth Avenue, New York

English Yachting

(Continued from Page 99.)

York policemen being called out to regulate the traffic of millionaires proceeding to build defenders at the mere mention of a challenge. In fact I have a suspicion that a few of your well-known magnates who are also yachtsmen are a little sick of the blooming trophy, and would be rather glad if we did not mention the matter at all. Even millionaires, especially when they have to part with money, are human, and it is bound to appeal to them as the very essence of silliness to sink money in a succession of 90-foot tea trays.

What the members of the New York Yacht Club think of the racing yacht is admirably expressed in the universal rule. What our people think, is expressed in the international rule. Still, there is the deed, I may be reminded. Yet I believe the Constitution of the United States of America has been altered. The fact is, the deed of gift is due for burial. It is out of date. It is out of sympathy with the times. The New York Club should burn it, and say "let us have a race any way, just by way of a new beginning." Besides, Sir Thomas Lipton deserves a race on his own terms after his three spirited efforts under the terms of the deed.

Quite a little boom in the building of thoroughbred racing yachts is proceeding, although there are no big boats on the stocks, as your people have, no doubt, found out Shamrocks and the like cost a deal of money to begin with, and run away with quite a lot more in racing expenses. It is an expensive game, and it has its risks. For instance, it may take no longer than a fortnight of racing to demonstrate beyond the shadow of a doubt that your expensive yacht is a complete and utter frost. You do not even get a run for your money. Or your vessel may be so good that your rivals get quickly sick and go out of the game, leaving you with nothing to race against.

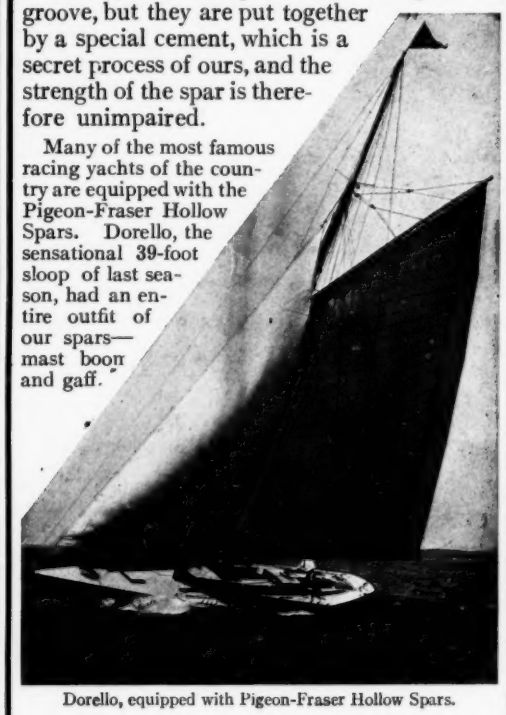
Very likely all these drawbacks to the possession of a £15,000 cutter, account for the favor into which the 15-metre class has come. A yacht of the class is being built in Spain from designs by Mr. Fife for King Alfonso. Two more are on the stocks at Fairlie for English yachtsmen, so that the prospects of the group are brighter than they have been for some time. With last season's new boat, Mariska, and Ma'oona and Shimna of the season before, we should see in Cowes week, at any rate, a notable gathering. The next international class to this—the 12 metre—seems to have taken stronger hold in the Clyde and on the Continent than it has here, for of the boats building to it one is for Major Andrew Coats; another for Colonel Sharman Crawford—and still another for a Norwegian, Mr. P. A. Larsen. Of 8 metre and 6-metre boats, quite a little fleet are projected or building here and across the North Sea.

Matters are not any brighter in motor boating, although the preparations for Monaco are attracting some attention. It will be time to write in a little detail about the vessels which are to go there, however, when the boats or their installations are a little further on. The meeting promises to be more than usually interesting. With two new classes of hydroplanes, our own summer is likely to be a marked advance on anything we have hitherto seen. The English motorboat clubs are wisely, I think, striving to keep down the costs of racing. For instance, in one of its classes the British Motor Boat Club recommends that an overall length of 18 feet be not exceeded. There is no other restriction of hull dimensions, and the only thing stipulated about the engine is a two-cylinder 4-inch diameter limit. A man is at liberty to exceed the 18 feet length of waterline if he likes, but if he does, the year's racing will cost him more.

The Pigeon-Fraser Hollow Spar is the Best Spar in the World

Did you ever hear of a Pigeon Spar collapsing? No? Neither have we! The reason is obvious. No dowels are used in their construction, nor are they made with tongue and groove, but they are put together by a special cement, which is a secret process of ours, and the strength of the spar is therefore unimpaired.

Many of the most famous racing yachts of the country are equipped with the Pigeon-Fraser Hollow Spars. Dorello, the sensational 39-foot sloop of last season, had an entire outfit of our spars—mast boom and gaff.



Dorello, equipped with Pigeon-Fraser Hollow Spars.

The Advantages of the Hollow Spar are not hard to find: the foremost being lightness and rigidity. Not only on the racing yacht are these advantages essential, but they are of equal importance on the cruiser. Owing to the comparative lightness of hollow spars and the saving of weight aloft, the violent rolling and pitching in a seaway can be greatly reduced, with a consequent lessening of the wear and tear on sails and rigging. Write us about hollow spars for your next boat.

PIGEON-FRASER HOLLOW SPAR CO.
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MARBLEHEAD GREEN
Absolutely Anti-Fouling
STEARNS & McKAY Mfgrs.
MARBLEHEAD, MASS.

High Grade Heavy Weight Tanks
For Gasolene, Water and Air of any shape or dimensions desired for any pressure. We make only work of merit.
"Light Competition Work Not Wanted."
Galvanizing of all kinds of marine work.
L. O. KOVEN & BROTHER
50 Cliff Street : : : New York

Measuring Horsepower

(Continued from page 102.)

Besides reducing the pull, the long arm steadies the action and renders the reading of the scale much easier. The blocks are tightened against the wheel till the speed is reduced to that at which the engine is to work regularly. The weight of the arm should be taken into consideration and either added to, or subtracted from P, as it is lifted or depressed by the motion of the engine. If the arm is made to balance in a horizontal position, this can be neglected.

The indicated horsepower of the steam engine and the calculated horsepower of the internal combustion engine are both much larger than the actual. There is a varying economy in the cylinder itself. Friction, also, is constantly changing and in the different styles of engines varies from 1½ per cent. in the old paddlewheel beam engine to as much as 25 per cent. in some of the short-stroke gasolene machines when the lubrication is not quite right. It may be even more.

While the brake horsepower gives what the engine can actually perform under certain conditions, it is sometimes very misleading, because no mention is made of the speed at which the test is made. Thus an engine tested in the shops at, say, 1,200 revolutions per minute, will only develop half as much power when in a boat where it can run but 600 revolutions. This point is apt to be overlooked by the purchaser, and engine manufacturers should see, especially in two-stroke engines, that they are tested and rated according to the number of revolutions they will actually turn up when installed in a boat and fitted with the propeller which is to be used.

Signaling Devices For Motor Boats

(Continued from page 96.)

ported in a standard to be screwed to the coaming or other suitable place on the boat. The field of the motor is connected by insulated wiring to the poles of the battery and a push-button switch is located near to the steering wheel. The motor is designed to operate on the regular six-volt battery and uses very little current. It can be used with wet or dry batteries and with direct-current dynamos.

AN ELECTRIC WHISTLE

An innovation in whistles for motor boats is the electric whistle, shown in Fig. 6. This is especially suited for use on electric launches, since it can be wired to a battery of eight to ten volts and requires no air tank or exhaust gases. It is neat in appearance and occupies very little space, measuring only 6 to 10 inches high by 3½ inches in diameter. It can, of course, be blown at any time, whether the motor is running or not. The sound is produced by electrically vibrating a tuned diaphragm until it gets into resonance with the enclosing shell, which is in the form of the ordinary steam whistle.

A MECHANICAL CLACKER

The principle of the vibrating diaphragm is utilized in a new device, shown in Fig. 7. In this the diaphragm is actuated by a small cam wheel, the cams of which are rapidly brought into contact with a metal button set in the center of the diaphragm, as in the sectional drawing. The wheel may be turned by hand; by means of a flexible shaft driven by a pulley in contact with the fly-wheel; or by a small electric motor with current from a six-volt storage battery or eight-volt dry battery. The motor is shown attached directly below the case which encloses the diaphragm in Fig. 7. The diaphragm is of vanadium steel and impervious to rust, and to provide against the collection of moisture in front of it there are drain holes through which the water escapes. The sound produced is not musical, but has great penetrating qualities.